

सत्यमेव जयते GOVERNMENT OF INDIA MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP



Ress Skilling India in Electronics Participant Handbook

Sector Electronics

Sub- Sector Consumer Electronics & IT Hardware

Occupation After Sales Support

Reference ID: ELE/Q3111, Version 2.0 NSQF Level 4

## Service Technician – Home Appliances

#### Published by

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is hereby issued by the

ELECTRONICS SECTOR SKILLS COUNCIL OF INDIA

for

#### **SKILLING CONTENT : PARTICIPANT HANDBOOK**

Complying to National Occupational Standards of

Job Role/Qualification Pack <u>"Service Technician – Home Appliances"</u>

QP No."ELE/3111, NSQF Level 4"

Date of Issuance: 24.02.2022 Valid up to\*: 02.06.2025 \*Valid up to the next review date of the Qualification Pack or the 'Valid up to' date mentioned above (whichever is earlier)

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Authorized Signatory Electronics Sector Skills Council of India

## Acknowledgments -

This participant's handbook meant for Service Technician – Home Appliances is a sincere attempt to ensure the availability of all the relevant information to the existing and prospective job holders in this job role. We have compiled the content with inputs from the relevant Subject Matter Experts (SMEs) and industry members to ensure it is the latest and authentic. We express our sincere gratitude to all the SMEs and industry members who have made invaluable contributions to the completion of this participant's handbook.

I would like to thank the SME and the team at the ESSCI along with the industry partners for the tireless effort in bringing the handbook in the current format.

This handbook will help deliver skill-based training in the field of Service Technician – Home Appliances. We hope that it will benefit all the stakeholders, such as participants, trainers, and evaluators. We have made all efforts to ensure the publication meets the current quality standards for the successful delivery of QP/NOS-based training programs. We welcome and appreciate any suggestions for future improvements to this hand book.

## **ABOUT THIS BOOK**

This participant handbook has been designed to serve as a guide for participants who aim to obtain the required knowledge and skills to undertake various activities as a Service Technician – Home Appliances. Its content has been aligned with the latest Qualification Pack (QP) prepared for the job role. With a qualified trainer's guidance, the participants will be equipped with the following for working efficiently in the job role:

- Knowledge and Understanding: The relevant repair & maintenance knowledge of home appliances and understand to perform the required repair & maintenance task of Home Appliances.
- Performance Criteria: The essential skills through hands-on training to perform the required repair & maintenance of home appliances to the applicable quality standards.
- Professional Skills: The Ability to make appropriate repair& maintenance decision about the home appliances.

The handbook details the relevant activities to be carried out by a Service Technician – Home Appliances. After studying this handbook, job holders will be adequately skilled to carry out their repair & maintenance duties efficiently according to the applicable quality standards, with minimum supervision.

The handbook has been divided into an appropriate number of units and sub-units based on the content of the relevant QP. We hope it will facilitate easy and structured learning for the participants. We sincerely hope that participants will obtain enhanced knowledge and skills after studying this handbook and make career progress in the relevant and senior job roles.

The Participant Handbook is designed based on the National Skill Qualification Framework (NSQF) aligned Qualification Pack (QP) and it comprises of the following National Occupation Standards (NOS)/ topics:

- ELE/N3101 Engage with customer for service
- ELE/N3112 Perform installation and repair of refrigerator
- ELE/N9905 Work effectively at the workplace
- ELE/N1002 Apply health and safety practices at the workplace
- Employability & Entrepreneurship Skills



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Introduction and orientation to the role of a Service Technician – Home Appliances

- Unit 1.1 Size and scope of the electronics industry and its various sub- sectors
- Unit 1.2 Opportunities for Service Technician Home Appliances in electronic industry.
- Unit 1.3 Roles and responsibilities of a Service Technician Home Appliances



## <sub>ြ</sub> Key Learning Outcomes 👸

By the end of this module, participants will be able to:

• State the role and responsibilities of a Service Technician – Home Appliances.

## Unit 1.1 Size and scope of the electronics industry and its various sub- sectors

## Unit Objectives 🞯

By the end of this unit, participants will be able to:

- 1. Describe the size and scope of the Electronics industry.
- 2. Identify the sub-sectors of the Electronics industry.

# **1.1 Describe the size and scope of the electronics industry and its various sub- sectors**

The Indian Electronics System Design & Manufacturing (ESDM) industry is one of the vital sectors of the Indian economy. The country has witnessed a substantial spike in demand for electronic products in the last few years. Today, India is positioned as the second-largest mobile phone manufacturer globally, with a surging internet penetration rate.

The ESDM sector is playing a vital role in the Indian government's goal of generating US\$ 1 trillion of economic value from the digital economy by 2025. With several government initiatives aiming to boost domestic manufacturing, India is witnessing increased production and assembly activities across products, such as consumer electronics and mobile phones.

#### **Market Size**

- The Indian electronics manufacturing industry is projected to reach US\$ 520 billion by 2025.
- In FY22 (until October 2021), imports of electronics goods stood at US\$ 28.59 billion, whereas exports stood at US\$ 7.89 billion.
- The demand for electronic products is expected to rise to US\$ 400 billion by 2025 from US\$ 33 billion in Fy20.
- The electronics market has witnessed a growth in demand, with market size increasing from US\$ 145 billion in FY16 to US\$ 215 billion in FY19—the market witnessed a growth of 14% CAGR from 2016-19.
- India's exports of electronic goods were valued at US\$ 11.7 billion in FY21.
- Smartphone shipments in India increased by ~82% YoY to reach 33.0 million units in the second quarter of 2021.
- The Electronics System Design & Manufacturing (ESDM) is broadly segregated into—electronics system and electronics design.
- The electronics system market is expected to witness 2.3x demand of its current size (FY19) to reach US\$ 160 billion by FY25.

- Electronics design segment, growing at 20.1%, was 22% of the ESDM market size in FY19; it is anticipated to be 27% of the ESDM market size in FY25.
- India's consumer electronics and appliances industry is expected to become the 5th largest globally by 2025.
- According to the Department for Promotion of Industry and Internal Trade, from April 2000 to June 2021, Foreign Direct Investment (FDI) equity inflows stood at US\$ 3,176.29 million.



## Unit 1.2 Opportunities for Service Technician – Home Appliances in electronic industry

## Unit Objectives 🞯

By the end of this unit, participants will be able to:

1. Scope of Service Technician – Home Appliances in electronic industry.

## **1.2.1 Career Pathways of Service** Technician – Home Appliances

There are different career pathways that a Service Technician – Home Appliances can take.

Following are some of them:

- Movement in the electronic industry or other related sectors where electrical equipment's are intensively used. The individual can work as an employee with such a company.
- With appropriate knowledge and adequate years of experience, the individual may also become a senior service technician of home appliance.
- Later, the individual may progress to a manager's level.
- The person can even work as an entrepreneur.
- Similarly, with strong technical expertise, one can even become a trainer at a training institute or start own training centre.

# **1.2.2** Personal Attributes of a Service Technician – Home Appliances

A Service Technician – Home Appliances needs to have some essential personal attributes for performing various activities effectively. The individual should have attention to detail and problemsolving skills to quickly identify any malfunctioning or problems with home appliances for their timely resolution. The person should have logical thinking to analyze a situation/problem logically to find an appropriate solution efficiently. Good decision-making skills are also important for the individual to ensure the correct decision is taken concerning the corrective measures to be taken for home appliances.

The person usually caters to clients who experience issues with their home appliances. For this reason, the individual needs to have good client-dealing skills and the ability to work as per their requirement. It also includes effective communication skills, i.e. talking courteously and listening attentively.

In a dynamic technological environment, it is also vital for the individual to stay updated with the latest developments in the field of work by reading the relevant literature and staying in contact with relevant persons.

## Unit 1.3 Roles and responsibilities of a Service Technician – Home Appliances

## Unit Objectives 🞯

By the end of this unit, participants will be able to:

1. Understand the duties of Service Technician - Home Appliances

## **1.3.1 Job Duties and Tasks for Service** Technician – Home Appliances

#### **Duties and Responsibilities:**

- Keep Home Appliances in working order.
- Diagnose problems and then repair/replace defective parts.
- Need to act quickly when a troubleshooting occurs and complain raised by customers.
- Make periodic inspection of appliances.
- Performs electrical maintenance and repair work; install/replace fixtures, switches, receptacles and wiring.
- Operates a variety of standard power tools, equipment and trenchers in electrical installations, maintenance and repair activities on a regular basis.
- Maintains records and logs as needed.
- Provides guidance and direction to less experienced personnel and others assigned to his/ her position.
- Perform other various tasks as instructed by management.

## 1.3.2 In addition, the individual

## has the following responsibilities:

- Communicating effectively at the workplace.
- Working effectively.
- Maintaining and enhancing professional competence.
- Working in a disciplined and ethical manner.
- Upholding social diversity in the workplace.
- Dealing with workplace hazards.
- Following fire safety practices.
- Following emergencies, rescue and first-aid procedures.
- Following effective waste management/recycling practices.

## Electrical equipment industry facing skilled manpower problem

- It said that the electrical equipment industry is facing a major problem in getting skilled and employable manpower which is technically competent, equipped with skills and ready to be deployed.
- "The industry is facing a looming skill gap, which is widening every year. Due to lack of skilled manpower, electrical equipment industry is suffering as it is affecting critical functions like R&D, consultancy, design and detailed engineering work," it added.
- The technical education system in the country does not promote innovative thinking, it said adding training being provided in the ITIs is out dated and the students are not able to meet the aspirations of the industry.
- "Even the qualified supervisors and engineers are not available. Those who are qualified are not well trained to meet the technical needs of the industry. Because of the above factors the labour productivity in India is far less than the labour productivity in China and Korea," the statement said.
- > It said that this is one of the important reasons for making the industry non-competitive and is also affecting the timely completion of the projects.
- The ministry said that there is an urgent need for training the work force for all the segments of the industry and making changes in the curriculum of the polytechnics and engineering colleges.

## EXERCISE

## **Short Questions**

- 1. Explain the importance of the electronics industry.
- 2. Write about Service Technician Home Appliances.
- 3. Explain briefly the problems faced by electronics industry.

## **Long Questions**

- 1. Describe the size and scope of the electronics industry and its various sub- sectors.
- **2.** Discuss the various opportunities for a Service Technician Home Appliances in the electronics industry.
- 3. Discuss the role and responsibilities of a Service Technician Home Appliances.

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## 2. Process of engaging with customer with service

Unit 2.1 Company Policy & Products. Unit 2.2 Dealing with Customers. Unit 2.3 Home Appliance Model & their features.



ELE/N3101

## Key Learning Outcomes 🔯

By the end of this module, participants will be able to:

- Explain company's policies on code of conduct, organisation's culture, customer care, reporting structure and documentation policy.
- State company's products and recurring problems reported in consumer appliances.
- Explain precautions to be taken while handling field calls and dealing with customers.
- Explain the importance of personal grooming with proper etiquettes at the customer's premises.
- List basic electrical, mechanical modules of various appliances and electronics involved in the type of appliance.
- State models of different appliances, their common and distinguishing features, functionality of different features of appliances and new features.

## **Unit 2.1 Company Policy & Products**

## Unit Objectives 🞯

By the end of this unit, participants will be able to:

- Explain company's policies on code of conduct, organisation's culture, customer care, reporting structure and documentation policy.
- State company's products and recurring problems reported in consumer appliances.

## 2.1.1 Company's policies on: customer care

- > An official, written policy that outlines company's customer service policies and procedures will reduce misunderstandings.
- A written policy is a guideline that all employees can easily refer to when providing customer service. It also ensures consistency of service throughout your business, regardless of when or where the service is being extended.
- In today's lawsuit-happy environment, a concrete customer service policy also protects your business by providing customers with clear expectations and remedies.

#### As you develop a customer service policy, keep several things in mind:

- State your company's promises clearly and concisely. Include the key points of your operating procedure and how you will address customer issues.
- Be clear, but do not make the policy too long or complex. Keep in mind the "KISS" principle: KISS stands for "Keep It Simple, Stupid!"
- The language should be easy to understand. Avoid legal terms or company acronyms that may be confusing to the average customer.
- Keep the language positive; make it about what you **will** do, not about what you will not do. "We will gladly accept returns for up to 30 days with a receipt" sounds much better than "No returns without a receipt after 30 days."
- Ask for input from your employees. Remember, these are the people who know your customers and what they want best.
- If at all possible, keep your customer service policy to one page in length.

## 2.1.2 Company's code of conduct

A code of conduct is the most common policy within an organization. This policy lays out the company's principles, standards, and the moral and ethical expectations that employees and third parties are held to as they interact with the organization. A code of conduct is an integral part of compliance efforts as it provides documentation that an employee or third party has violated company policy if illegal activity arises. Let's explore what a code of conduct means and the impact it can have on an organization.

#### Why is having a Code of Conduct Important?

A code of conduct serves as a reference point for employees to make better choices on a dayto-day basis. While every possible ethical dilemma an employee might encounter won't be spelled out, the code should lay out the guiding principles by which employees should act and therefore lead there workforce to make the right decision.

Having a strong, ethical code of conduct is essential to building a culture of compliance throughout an organization. A code of conduct is an excellent exercise to focus the leadership team on how employees should behave at work and the standards they should uphold. These standards can have massive impacts on how the organization functions, how employees conduct themselves daily, and how the workforce interacts with others on behalf of the organization.

## 2.1.3 Organisation culture and typical customer profile

#### **Organisation culture**

- An organization's culture defines the proper way to behave within the organization. This culture consists of shared beliefs and values established by leaders and then communicated and reinforced through various methods, ultimately shaping employee perceptions, behaviors and understanding.
- An employer must begin with a thorough understanding of what culture is in a general sense and what their organization's specific culture is. At the deepest level, an organization's culture is based on values derived from basic assumptions about the following:

**Human nature.** Are people inherently good or bad, mutable or immutable, proactive or reactive? These basic assumptions lead to beliefs about how employees, customers and suppliers should interact and how they should be managed.

The organization's relationship to its environment. How does the organization define its business and its constituencies?

**Appropriate emotions.** Which emotions should people be encouraged to express, and which ones should be suppressed?

**Effectiveness.** What metrics show whether the organization and its individual components are doing well? An organization will be effective only when the culture is supported by an appropriate business strategy and a structure that is appropriate for both the business and the desired culture.

#### **Customer profile**

- A customer profile is a document or platform that contains key information about your ideal customers and their interactions with your business. It covers customer pain points, interests, buying patterns, demographic data, and more. These details can help your company understand how consumers engage with your brand and products, so you're able to customize campaigns and provide personalized support.
- Support teams can use buyer profiles to provide personalized customer service. Whenever a consumer reaches out for help, their details should be recorded so there's an interaction history. This gives agents valuable information that they can leverage in the future. When agents have context on who they're serving and what their experience has been so far with the company, they can cater to individual customers. For instance, if your agents can see exactly which solutions a customer has already tried, it will improve the quality of support they provide.

## **2.1.4 Explain company's reporting structure**

- A reporting structure refers to the interrelationship between various authorities in a company. This is a hierarchal chain of command that clarifies who reports to whom.
- The purpose of a business's reporting structure is to direct employees on where and how the company's authority flows. It clarifies the functions of various employees, including the manager or managers they have to report to, and the departments that they handle.
- Companies set up reporting structures to identify which employees are in charge of various functions, departments and the entire organization. Their structure depends on several factors, including the size of the company, type of business, products and services produced, current projects, geographic locations and the employee's individual expertise.
- Organizational structures can change occasionally based on external influences such as the global economy or internal factors such as change of ownership.

#### **Types of Reporting Structures**

#### • Traditional vertical reporting structure

This is the most common organizational reporting structure. For this structure, a singular individual sits at helm of the company.

#### • Functional reporting structure

The functional reporting structure fits best into a company with several divisions that are set forth to accomplish individual tasks.

#### • Divisional or product reporting structure

The divisional or product reporting structure is ideal for large companies, which have many products and sales channels.

#### • Line-and-staff reporting structure

The line-and-staff reporting structure varies from a typical vertical structure because it includes horizontal authority.

Line symbolizes the business positions that are required for daily operations.

Staff symbolizes the business positions that offer indirect support to daily operations and line roles.

#### • Flat reporting structure

The flat reporting structure works for organizations that have zero distinct authoritative positions.

#### • Matrix reporting structure

A matrix or hybrid reporting structure considers the needs of a particular organization and combines at least two organizational hierarchies that satisfy the identified needs.

#### Network organization structures

A network reporting structure forth to make sense of the spread of resources.

## -2.1.5 Company's documentation policy -

- > The ultimate dream of every business owner is to have efficient employees, effective communication, and growth! Yet, maintaining all three together is not that easy!
- The more your company grows, the harder it gets to effectively communicate, and eventually more difficult it becomes to ensure that your employees carry out their tasks efficiently aligned with the objectives of your company!
- To maintain a successful cycle, your company needs rules and guidelines to manage employees for a smooth workflow. They also, in turn, need constant assurance that the company has their best interests at heart!
- ➢ However, accomplishing all this can be overwhelming without some kind of help. This is where the need to create a policies & procedures manual comes in.
- Every company needs a policies & procedures manual to guide its operations, strategy, and workflow. Where policies set the expectation for employee behaviors, the *procedures* outline the steps for it. This ensures consistency in practice and helps in maintaining quality output.
- A policy and procedure manual is the perfect way to keep your virtual employees on the same page as these manuals work like references in case someone is confused about taking a step or decision-making and enables everyone to behave in a legal, conscious, and ethical manner.

Here are some items that should be included in the policies and procedures manual:

- Employment procedures
- Work from home policies
- Organization culture
- Employee benefits
- Communication policies
- Payment procedures
- Workplace guidelines
- Employee code of conduct
- Technology usage procedures

## 2.1.6 Explain company's line of business and product offerings

**Line of business** is a term that describes a business's product or service, the resources used, and the process for delivering value to a market segment. It could be the primary or one of the main processes that bring revenue.

The LOB manager is concerned with how the department they oversee delivers value to the customer and remains competitive.

The LOB manager may have responsibilities like:

- Reducing operations, IT, and administration costs.
- Budgeting and achieving revenue goals.
- Forecasting sales
- Maximizing productivity
- Overseeing day-to-day operations e.g., staffing, equipment upgrades, training, etc.
- Assessing and minimizing risks.
- Analyzing changes in market demands and their implication
- Implementing changes
- Identifying opportunities that may give the LOB a competitive advantage

#### **Product offerings**

- According to Philip Kotler, a product line can be defined as "a group of products that are closely related because they function in a similar manner, and sold to the same customer groups, are marketed through these same types of outlets, fall within given price range."
- In the above definition, Philip Kotler emphasizes a few points, which I want to discuss below:

**Closely Related Products**. In any product line, the products are closely related. For example, Pepsi has a Beverages product category which includes Pepsi, Dew, Aquafina, Brisk, and many more. These products are related and target a specific group of people and preferences.

## 2.1.7 Explain company's Human Resource and performance evaluation policy

HR policies of a company define the process through which an employer and employee(s) together can achieve the company's goals. The HR policies for a company must be drafted in accordance with the company's objectives and work ethics.

#### Important things in HR Company's policies in India:

- Working Hour For a company in India, HR policies must state the working days and timing policy of the company. It must include information relating to overtime, additional hours, and lateness for work.
- **Code of Conduct** In India, the HR policy of the company must state the code of conduct that the employees have to abide by and the business environment that has to be maintained while working with each other. It must also mention the procedure to report a breach of this code of conduct.
- Leave Policy The leave policy of a company must include provisions relating to leave allowed annually, including provisions relating to maternity leave. It must state the national holidays, sick leaves, and paid leaves granted to the employees. Also, the stipulation related to non-paid leaves taken by employees and the percentage of salary deducted for such leaves must be stated.
- Interpersonal Relationships In India, the HR policy of a company should state the company's code with regards to interpersonal relationships and business interactions between employers and employees. The policy must define the role and responsibility of employees in supervisory positions, and their ability to influence other employees during and after office hours.
- Performance Management & Appraisal Performance improvement and appraisal policy of the company must be a part of the company's HR policies. It should clearly state the methods to improve an employee's performance like training, counselling, verbal, and written warning, etc.

- **Probation** HR policies must state the time period of probation and probation assessment procedure after which an employee may be hired as a permanent employee of the company.
- **Grievance Redressal** The HR policy manual in India must also mention about the grievance redressal procedure that is to be followed by the company upon receiving a complaint from an employee. The HR policies and procedures in India must also establish a Grievance Redressal Committee that addresses any complaints from employees regarding job harassment, employee discourse or other issues faced by an employee during his course of employment and Sexual Harassment Committee to deal with any sexual harassment complaints.
- Intellectual Property Policy about non-disclosure of a company's confidential information and Intellectual Property that the employees get access to, must be a part of the HR policies for employees. They must mention in the contract of the employee that if the company requires its employees to sign a Non-Disclosure Agreement regarding the company's information accessed by an employee during his/her course of employment, he/she should be willing to abide by it.

# 2.1.8 Explain company's products and problems reported –

A product is an object, or system, or service made available for consumer use as of the consumer demand; it is anything that can be offered to a market to satisfy the desire or need of a customer. In retailing, products are often referred to as merchandise, and in manufacturing, products are bought as raw materials and then sold as finished goods. A service is also regarded as a type of product.

## Most common customer service challenges

#### 1. Not knowing the answer to a question

#### The solution

This is a chance for your team to direct the customer down the right path, or if possible, gather the right information themselves. This could involve directing customers to a knowledge base or putting them in touch with the correct team member to help

Whatever the issue, acknowledge the customer's question and lay out a plan to address the situation. Most importantly, follow up when you say you will, even if it's just an honest update that the issue may take longer than expected to solve.

#### 2. Transferring customer calls

Transferring calls can be annoying for everyone involved. Customers often end up frustrated after wasting time repeating information, and with multiple agents involved, it means more time spent waiting for incoming calls or chats to be answered.

#### The solution

Explain the problem in simple terms, tell them why you need to transfer the call to another team member, and how that person can better help the situation. Understanding the 'why' behind the transfer ensures the customer knows you get their issue and you're not just transferring them needlessly. The right answer is often only a conversation away.

#### 3. Not having the right tools

When customer service representatives lack the necessary tools to meet your customers wherever they are, the support process becomes slow and can cause frustration.

#### The solution

Finding the right customer engagement <u>softwar</u> that meets both your business and customer needs is key here. Tools like live chat, cobrowse, and chatbots can all help improve customer service workflows as well as the overall experience.

#### 4. Customer service workflows aren't aligned with the customer's journey

Without mapping out customer support workflows, bottlenecks or breakdowns can go unnoticed and unaddressed. And if customers run into too many issues along their journey it could cause them to abandon things altogether.

#### The solution

If you haven't already, it's time to build a customer journey map detailing every touch point a person goes through on the route to conversion. Each touch point should allow access to customer support, whether it be a chatbot, live chat, or knowledge base articles.

#### 5. Dealing with angry customers

One major customer service challenge support teams face is angry customers. The challenge comes from reaching a satisfying conclusion for everyone involved, calmly and efficiently. There are many reasons a customer may be angry, but, regardless of the cause, it's your team's job to handle the situation properly.

#### The solution:

Whatever the issue, giving the customer an apology, explanation, and reassurance is a must. Take a leaf out of Disney's book with the HEARD technique. HEARD stands for:

- Hear: Let the customer tell their entire story without interruption.
- Empathize: Convey that you understand how the customer feels.
- **Apologize:** Even if whatever made them upset isn't your fault, give a genuine apology for how the customer feels.
- **Resolve:** Resolve the issue quickly and, if possible, give employees the power to solve the issue without escalation. Don't be afraid to ask the customer, "What can I do to make this right?"
- **Diagnose:** Understand why the issue happened without shifting blame; focus on fixing the process.

#### 6. No crisis management or escalation protocol

Regardless of what the particular crisis entails, customer service will undoubtedly be at the front line, answering questions and solving the problems. The best thing you can do is be prepared because you never know when trouble could strike.

#### The solution

- Make a plan. Put a standard operating procedure in place to handle crises and escalations. Be sure agents are clear on who to contact for specific types of issues and when it's necessary to escalate an issue.
- Let your teams call some of the shots. The goal is to solve your customers' problems as fast as you can while keeping them happy. Give your team the ability to discern when discounts or compensation, for example, could be used as a solution to avoid having to escalate to upper management and risk having customers wait longer.
- Build workflows that keep crisis management in mind. Set up the necessary tags and automations to help agents identify and escalate tickets that need immediate attention.

#### 7. Not meeting customer expectations

Customer expectations constantly change and to fulfill them you need to understand exactly who your customer is, the journey they take while interacting with your brand, and what it is they want from you.

#### The Solution

- **Collect customer feedback.** Whether its customer surveys, reviewing chat logs, or customer interviews, feedback directly from the people who use your product or service is extremely important when trying to improve the overall customer experience.
- Focus on the small things. Improving your customer service doesn't have to mean overhauling your entire strategy. Make small changes where you can and take it step by step. It might seem insignificant at first, but small improvements add up over time.
- Stay one step ahead. At one point in time, a simple chatbot was enough. Now an omnichannel approach is considered the norm. It's safe to say this will continue to evolve over time. The point is, don't just settle for the industry standard or good enough. Keep up with the times but keep your eyes on the horizon too.

## **Unit 2.2 Dealing with Customers**

## Unit Objectives 🚳

By the end of this unit, participants will be able to:

- Explain precautions to be taken while handling field calls and dealing with customers.
- Explain the importance of personal grooming with proper etiquettes at the customer's premises.
- List basic electrical, mechanical modules of various appliances and electronics involved in the type of appliance.

# 2.2.1 List the precautions to be taken while handling field calls and dealing with customers \_

#### 5 Fundamental Do's of Customer Service

1. Respect your customer

Any relationship, be it a personal or a business one, starts with respect. Customer service is all about making customers feel valuable and important. Any customer deserves your full attention and polite, friendly attitude. That's the easiest way to show that you really care and generate a wholesome experience that lasts.

2. Be Honest

Nothing destroys trust faster than broken promises. So always do what you promised. Be fair about prices, additional fees and extra charges. Establish clear return and refund policies. Deliver on time, or even earlier. Respond and follow-up when you say you will. Provide the services you say you provide in your correspondence and in your marketing.

3. Take Responsibility

Professionalism in customer service implies that you are ready to take responsibility for the problems or negative experiences that customers are having with your company, products or services. This means that you, as a front-line company representative, are ready to sincerely apologize to a customer on behalf of your business, even when a problem or a situation that caused customer's frustration was not your fault at all.

4. Always Put Yourself in The Customer's Shoes

Have you ever tried putting yourself in the place of the customer before addressing their request? It probably comes with experience

5. Express Your Gratitude

Words of gratitude will make your customers feel appreciated for their loyalty to your brand. Saying "Thank You" to the people who support your business won't take you much effort but it will definitely show how grateful you are that they choose your product or service. Also, it shows you appreciate the opportunity to be helpful and provide assistance to the customer.

#### 5 Essential Don'ts of Customer Service

1. Don't Make Things Overly Complicated

Never underestimate the inexperience of your customers. Today's consumers are much more sophisticated, experienced and technically savvy, but they still expect that the process of contacting your customer service is easy and straightforward. You need to make sure your customers have easy access to support when it is needed. It goes without saying that your customer service needs to include several, if not all, of the tools available today, including phone, e-mail, Live Chat, FAQs, self-service, social media channels and more.

2. Don't Be Indifferent

Indifference kills customer service. It means you just don't care anymore.

3. Don't Treat Customers as Transactions

Don't treat people coming to your website or office as one-time transaction, do all your best to build strong and long-lasting relationship. Show a true interest in doing business with them and stay in touch to nurture the relationship.

4. Don't Ignore Customer Feedback

Make sure you listen to your customers. They are the people who want your company to perform better, so let them share their opinion about their experience with you, keep open to any kind of suggestions or feedback they might have. Let them know that you really care about what they think and expect of you.

5. Don't Be Afraid of Complaints

No matter how hard you try, you can't satisfy all your customers all the time. Complaints are inevitable, so don't discourage them.

## 2.2.2 Explain relevant reference sheets, manuals and documents to carry in the field -

#### Manuals are flexible documents that can be used for different purposes:

- Policy manuals explain and outline the principles and rules of an organization. For example, a company's policy manual may address matters such as the company's vision and mission, the company code of ethics, and employee guidelines relating to work activities, compensation and benefits.
- Procedures manuals explain how a work activity is to be performed. Keep in mind that a policy manual tells you what a policy is and perhaps why it's in place, while a procedures manual may tell you how to carry out a policy-related activity.
- Operations manuals are similar to procedures manuals, but are focused on daily work activities.
- User's manuals and operator's manuals serve as a guide and reference for the use of a particular tool or piece of equipment.
- Service and maintenance manuals provide instructions on how to maintain and repair equipment.
- Training manuals are written to provide guidance for people new to an organization or specific work activity.
- Field manuals are used by workers at remote worksites. These manuals are designed to be self-contained, providing all the policies, procedures and instructions that a worker needs on the jobsite.

### **2.2.3 Explain etiquette to be followed at customer's premises**

It is crucial to understand the importance of customer service etiquette for interacting with customers. In order to gain that understanding, you need to train & educate your employees on how to communicate with customers to deliver excellent customer service experience.

Here are the key customer service manners and rules that will help you to deliver excellent customer support.

- Be transparent about your products and services
- Offer proactive sales & support assistance
- Ask the customer for feedback after a resolution
- Use the right vocabulary
- Personalize your conversation
- Listen to your customers
- Offer gratitude to your customers
- Maintain a professional attitude
- Drill customer service etiquettes in your team
- Use interpersonal skills
- Keep your customers updated
- Be confident

# 2.2.4 List basic electrical, mechanical modules of various appliances and electronics involved in the type of appliance -

- A home appliance, also referred to as a domestic appliance, an electric appliance or a household appliance, is a machine which assists in household functions such as cooking, cleaning and food preservation.
- Appliances are divided into three types:
  - Small appliances;
  - Major appliances, or white goods;
  - And consumer electronics, or brown goods.

This categorization is reflected in the maintenance and repair of these types of products.

 Brown goods typically require high technical knowledge and skills (which get more complex with time, such as going from a soldering iron to a hot-air soldering station), while white goods may need more practical skills and force to manipulate the devices and heavy tools required to repair them.

#### Major appliances

Major appliances, also known as white goods, comprise major household appliances and may include: air conditioners,<sup>[</sup> dishwashers, clothes dryers, drying cabinets, freezers, refrigerators, kitchen stoves, water heaters, washing machines, trash compactors, microwave ovens, and induction cookers. White goods were typically painted or enamelled white, and many of them still are.

#### Small appliances

Small appliances are typically small household electrical machines, also very useful and easily carried and installed. Yet another category is used in the kitchen, including: juicers, electric mixers, meat grinders, coffee grinders, deep fryers, herb grinders, food processors, electric kettles, waffle irons, coffee makers, blenders<sup>[12]</sup> and dough blenders, rice cookers, toasters and exhaust hoods.

## **Unit 2.3 Home Appliance Model & their features**

## Unit Objectives 🞯



• State models of different appliances, their common and distinguishing features, functionality of different features of appliances and new features.

## 2.3.1 State models of different appliances, their common and distinguishing features, functionality of different features of appliances and new features

Major appliances may be roughly divided as follows:

- Refrigeration appliances
  - Freezer
  - Refrigerator
  - Water cooler
  - Ice maker

#### • Cooking appliances

- Kitchen stove, also known as a range, cooker, oven, cooking plate, or cooktop
- Wall oven
- Steamer oven
- Microwave oven

#### Washing and drying appliances

- Washing machine
- Clothes dryer
- Drying cabinet
- Dishwasher

#### Heating and cooling appliances

- Air conditioner
- Furnace
- Water heater
- Whole house ventilator appliances
  - Mechanical Air Ventilator
Modern appliances, such as, freezers, ovens, stoves, dishwashers, clothes washers and dryers, use significantly less energy than older appliances. Installing a clothesline will significantly reduce one's energy consumption as their dryer will be used less. Current energy-efficient refrigerators, for example, use 40 percent less energy than conventional models did in 2001. Following this, if all households in Europe changed their more than ten-year-old appliances into new ones, 20 billion kWh of electricity would be saved annually, hence reducing  $CO_2$  emissions by almost 18 billion kg. In the US, the corresponding figures would be 17 billion kWh of electricity and 27,000,000,000 lb  $(1.2 \times 10^{10} \text{ kg}) CO_2$ . According to a 2009 study from McKinsey & Company the replacement of old appliances is one of the most efficient global measures to reduce emissions of greenhouse gases. Modern power management systems also reduce energy usage by idle appliances by turning them off or putting them into a low-energy mode after a certain time. Many countries identify energy-efficient appliances using energy input labelling.

The impact of energy efficiency on peak demand depends on when the appliance is used. For example, an air conditioner uses more energy during the afternoon when it is hot. Therefore, an energy-efficient air conditioner will have a larger impact on peak demand than off-peak demand. An energy-efficient dishwasher, on the other hand, uses more energy during the late evening when people do their dishes. This appliance may have little to no impact on peak demand.

Over the period 2001-2021, tech companies have replaced the traditional silicon switch in an electric circuit with quicker gallium nitride transistors to make new gadgets as energy efficient as feasible. Gallium nitride transistors are, however, more costly. This is a significant change in lowering the carbon footprint.

## EXERCISE

### **Short Questions**

- 1. Why is having a code of conduct important?
- 2. Explain Flat, Line & Staff, and Matrix structure of Organization.
- 3. What is Line of Business?
- 4. Write about Intellectual Property.
- 5. Explain cooking and washing appliances.

#### Long Questions

- 1. Explain company's policies on code of conduct, organisation's culture, customer care, reporting structure and documentation policy.
- 2. State company's products and recurring problems reported in consumer appliances.
- 3. Explain precautions to be taken while handling field calls and dealing with customers.
- 4. Explain the importance of personal grooming with proper etiquettes at the customer's premises.
- 5. List basic electrical, mechanical modules of various appliances and electronics involved in the type of appliance.
- 6. State models of different appliances, their common and distinguishing features, functionality of different features of appliances and new features.

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Skilling India in Electronics

सत्यमेव जयते GOVERNMENT OF INDIA MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP



3. Process of installation and repairing appliances

- Unit 3.1 Sales Support Policy.
- Unit 3.2 Refrigerator & its type.
- Unit 3.3 Refrigerator Manufacturing.
- Unit 3.4 Refrigeration cycle & Method of refrigeration.
- Unit 3.5 Refrigerants.
- Unit 3.6 Installation, Fixing accessories & Usage guidelines.
- Unit 3.7 Test equipment's & Safety Precaution.
- Unit 3.8 Fundamental of Electricity.
- Unit 3.9 Repair & Replacement.
- Unit 3.10 Refrigerator Models & Prices.
- Unit 3.11 Energy Rating & Troubleshooting Knowledge
- Unit 3.12 Other Home Appliance.



#### ELE/N3112

## Key Learning Outcomes 🔯

By the end of this module, participants will be able to:

- Explain the company's policy on product's warranty, sales, installation, after sales support policy and other terms and conditions.
- Explain different types of refrigerators such as traditional, frost-free, peltier with all features and functionalities of various models.
- State refrigerator manufacturing capabilities of the organisation, models of the company and their respective features.
- List installation-site requirements such as structural requirements, ventilation, etc.
- Explain the refrigeration cycle and functioning of the appliance and its various modules, including various electromechanical parts of the refrigerator.
- Describe the method of refrigeration, its use and functioning of refrigerator sealed system.
- Explain types of refrigerants such as R12, R22, R134a, R290, R600a, R410, R32, use of different brazing sticks, types of brazing torches, fluxes and their application.
- Describe manual-based procedure of installing the refrigerators.
- Describe methods of fixing various accessories, parts that have accompanied the unit and their features.
- Explain how to use the appliance and its various features/functionalities after installation.
- Explain the use of test equipment and tools such as multi-meter, oscilloscope etc.
- Explain safety precautions/rules, policies, procedures and quality standards to be followed.
- Explain the fundamentals of electricity such as ohms law, difference between ac and dc, understanding of domestic wiring, understanding of series and parallel connections.
- Explain how to rectify so as to avoid repeat fault in the refrigerator.
- Describe the process of selection of appropriate spares for replacement.
- Explain basic knowledge of components such as diode, transformer, LED, photo transistor, capacitor, thermistor ICs etc.
- Explain components/modules of refrigerators and their prices.
- Describe packaging waste disposal procedures.
- State refrigerator energy ratings such as BEE rating.
- State troubleshooting knowledge with respect to refrigerators.
- Explain various hazards, their causes and prevention/personal safety.
- Explain frequently occurring faults such as noise, water dripping and insufficient cooling, their causes and solutions.
- Describe other products of the company

## **Unit 3.1 Sales Support Policy**

## Unit Objectives Ø



By the end of this unit, participants will be able to:

 Explain the company's policy on product's warranty, sales, installation, after sales support policy and other terms and conditions.

## **3.1.1 Explain the company's policy on product's warranty, sales,** installation, after sales support policy and other terms and conditions

#### Explain different models of after sales support provided by the company

- > The concept of after sales service is as important as sales. While it does not generate any revenue for the company, it surely does increase the goodwill of the organization in the market and amongst the customers. After sales service is very important to not only retain the customers but also to bring back lost customers.
- > After sales service could be defined as the processes which are followed post the sale of the product. The nature of the services includes maintenance, guidance, repair etc.
- > The nature of after sales service depends entirely on the industry and the product. While some may require installation, others may require cleaning every couple of months.

#### Steps for good after sales service:

- Updating the customers about the nature of after sales service.
- Updating the customers about the transit of the goods.
- Following up with the delivery team to ensure timely delivery.
- Following up on new customer or installation.
- Fast after sales service post complaint.

## **Common types of after sales service**

#### 1) Pre-Installation services

Whenever a product is bought it comes with a manual for installation. Depending on the nature of the product the installation may vary. While some products have very specific installation steps other products are customer friendly.

#### 2) User training

Training of the end user is another part of after sales service. In the case of industrial machinery, this is a very crucial part. It is very essential that user training is provided propositions user is going to be handling the product.

#### 3) Warranty services

This is perhaps the most common type of after sales service provided by almost every company for almost every product. Warranty services include repairing replacement of selected parts for a selected period of time.

Some companies provide a service of extended warranty wherein the customer can pay a little extra and get the warranty extended for a limited duration. Extended warranty is useful in the case of electronics.

#### 4) Online support

Companies have started providing online support for any of the product related queries. There is a dedicated helpline for customer service wherein the grievance redressal mechanism is carried out according to the standard procedure of the company. The customer may call the online support or chat as per his comfort, discuss the problem and get it resolved. Online support is very effective for software services and laptop support. The customer service can share the screen and resolve the problem immediately in most of the cases

#### 5) Return/Replacement

For a Limited period of time companies provide free replacement of the product in case of any queries. However, this is with certain terms and conditions. In some cases, replacement may be of the entire device, or in other cases, replacement may be only of the defective part.

#### 6) Features and benefits

One of the Types of after sales service, some companies provide additional features for example replacement of a part for a lifetime, for free counseling for the entire duration of the product.

#### 7) Upgrades

This usually works with software and electronics. Upgrading a software for the device for a limited period is one of the Types of after sales service followed by companies.

#### 8) Loyalty Program

Although considered as an example of sales promotion, a customer loyalty program can also be considered another type of after-sales service because it can help maintain a relationship with the customers and foster loyalty. To be specific, a loyalty program features privileges, discounts, and special offers, among others given to customers beyond the point of sales. It is typically coursed through membership using a loyalty or reward card or via a mailing list subscription.

#### 9) Freebies

Freebies can include free product samples or services related to a particular purchased product.

## Unit 3.2 Refrigerator & its type

## Unit Objectives 🞯

By the end of this unit, participants will be able to:

• Explain different types of refrigerators such as traditional, frost-free, peltier with all features and functionalities of various models.

## **3.2.1** Explain different types of refrigerators such as traditional, frostfree, peltier with all features and functionalities of various models

Domestic refrigerators and freezers for food storage are made in a range of sizes. Among the smallest is a 4 L Peltier refrigerator advertised as being able to hold 6 cans of beer. A large domestic refrigerator stands as tall as a person and may be about 1 m wide with a capacity of 600 L. Some models for small households fit under kitchen work surfaces, usually about 86 cm high. Refrigerators may be combined with freezers, either stacked with refrigerator or freezer above, below, or side by side. A refrigerator without a frozen food storage compartment may have a small section just to make ice cubes. Freezers may have drawers to store food in, or they may have no divisions (chest freezers).

Refrigerators and freezers may be free-standing, or built into a kitchen.

### Three distinct classes of refrigerator are common:

#### **Compressor refrigerators**

 Compressor refrigerators are by far the most common type; they make a noticeable noise, but are most efficient and give greatest cooling effect. Portable compressor refrigerators for recreational vehicle (RV) and camping use are expensive but effective and reliable. Refrigeration units for commercial and industrial applications can be made in various sizes, shapes and styles to fit customer needs. Commercial and industrial refrigerators may have their compressors located away from the cabinet (similar to split system air conditioners) to reduce noise nuisance and reduce the load on air conditioning in hot weather.

#### Absorption refrigerator

 Absorption refrigerators may be used in caravans and trailers, and dwellings lacking electricity, such as farms or rural cabins, where they have a long history. They may be powered by any heat source: gas (natural or propane) or kerosene being common. Models made for camping and RV use often have the option of running (inefficiently) on 12 volt battery power.

#### Peltier refrigerators

 Peltier refrigerators are powered by electricity, usually 12 volt DC, but mains-powered wine coolers are available. Peltier refrigerators are inexpensive but inefficient and become progressively more inefficient with increased cooling effect; much of this inefficiency may be related to the temperature differential across the short distance between the "hot" and "cold" sides of the Peltier cell. Peltier refrigerators generally use heat sinks and fans to lower this differential; the only noise produced comes from the fan. Reversing the polarity of the voltage applied to the Peltier cells results in a heating rather than cooling effect.

Other specialized cooling mechanisms may be used for cooling, but have not been applied to domestic or commercial refrigerators.

#### Magnetic refrigerator

- Magnetic refrigerators are refrigerators that work on the magnetocaloric effect. The cooling effect is triggered by placing a metal alloy in a magnetic field.
- Acoustic refrigerators are refrigerators that use resonant linear reciprocating motors/alternators to generate a sound that is converted to heat and cold using compressed helium gas. The heat is discarded and the cold is routed to the refrigerator.

## 3.2.2 Features of Refrigerator

#### Newer refrigerators may include:

- Automatic defrosting
- A power failure warning that alerts the user by flashing a temperature display. It may display the maximum temperature reached during the power failure, and whether frozen food has defrosted or may contain harmful bacteria.
- Chilled water and ice from a dispenser in the door. Water and ice dispensing became available in the 1970s. In some refrigerators, the process of making ice is built-in so the user doesn't have to manually use ice trays. Some refrigerators have water chillers and water filtration systems.
- Cabinet rollers that lets the refrigerator roll out for easier cleaning
- Adjustable shelves and trays
- A status indicator that notifies when it is time to change the water filter
- An in-door ice caddy, which relocates the ice-maker storage to the freezer door and saves approximately 60 litres (2 cu ft) of usable freezer space. It is also removable, and helps to prevent ice-maker clogging.
- A cooling zone in the refrigerator door shelves. Air from the freezer section is diverted to the refrigerator door, to cool milk or juice stored in the door shelf.
- A drop down door built into the refrigerator main door, giving easy access to frequently used items such as milk, thus saving energy by not having to open the main door.
- A Fast Freeze function to rapidly cool foods by running the compressor for a predetermined amount of time and thus temporarily lowering the freezer temperature below normal operating levels. It is recommended to use this feature several hours before adding more than 1 kg of unfrozen food to the freezer. For freezers without this feature, lowering the temperature setting to the coldest will have the same effect.

• Freezer Defrost: Early freezer units accumulated ice crystals around the freezing units. This was a result of humidity introduced into the units when the doors to the freezer were opened condensing on the cold parts, then freezing. This frost buildup required periodic thawing ("defrosting") of the units to maintain their efficiency. Manual Defrost (referred to as Cyclic) units are still available. Advances in automatic defrosting eliminating the thawing task were introduced in the 1950s, but are not universal, due to energy performance and cost. These units used a counter that only defrosted the freezer compartment (Freezer Chest) when a specific number of door openings had been made. The units were just a small timer combined with an electrical heater wire that heated the freezer's walls for a short amount of time to remove all traces of frost/frosting. Also, early units featured freezer compartments located within the larger refrigerator, and accessed by opening the refrigerator door, and then the smaller internal freezer door; units featuring an entirely separate freezer compartment were introduced in the early 1960s, becoming the industry standard by the middle of that decade.

These older freezer compartments were the main cooling body of the refrigerator, and only maintained a temperature of around -6 °C (21 °F), which is suitable for keeping food for a week.

• Butter heater: In the early 1950s, the butter conditioner's patent was filed and published by the inventor Nave Alfred E. This feature was supposed to "provide a new and improved food storage receptacle for storing butter or the like which may quickly and easily be removed from the refrigerator cabinet for the purpose of cleaning." Because of the high interest to the invention, companies in UK, New Zealand, and Australia started to include the feature into the mass fridge production and soon it became a symbol of the local culture. However, not long after that it was removed from production as according to the companies this was the only way for them to meet new ecology regulations and they found it inefficient to have a heat generating device inside a commercial fridge.

Later advances included automatic ice units and self-compartmentalized freezing units.

### **Unit 3.3 Refrigerator Manufacturing**

## Unit Objectives 🞯

By the end of this unit, participants will be able to:

- State refrigerator manufacturing capabilities of the organisation, models of the company and their respective features.
- List installation-site requirements such as structural requirements, ventilation, etc.

## **3.3.1** State refrigerator manufacturing capabilities of the organisation, models of the company and their respective features –

#### Best Refrigerator Brands in India

We have listed each brand with its bestselling model including its pricing, special features, technology, pros, and cons. Please note that the brands have been categorized as per the price of their bestselling models and not as the top-ranking brands on a scale of 0 to 10.

## 1. Haier 258 L 3-star Inverter Frost-Free Double Door Refrigerator (HEF-25TDS, Dazzle Steel, Convertible)

Haier is a leading smart-appliance brand specializing in highly efficient refrigerators. The brand manufactures fridges with remarkable build quality, impeccable designs, and most importantly, great functionality.

The Haier 258 L double-door refrigerator is 3-stars rated and features a sleek and stylish design. double-door refrigerator. Economical and functional, this refrigerator is backed by twin inverter technology that ensures the compressor and the fan motor both run uniformly without any fluctuations at DC thus providing consistent cooling. Moreover, the twin inverter technology is energy efficient and cuts back on your electricity bills.

The refrigerator is a 5-in-1 convertible that allows you to store your food and cater to all your refrigerator needs accordingly. Also, the multi airflow keeps your food fresh for a little longer and provides you with more space than before. Its thicker PUF helps in retaining low temperatures for better cooling. With this refrigerator you need not worry about power fluctuations as it can work on a power supply as low as 135V, hence providing you with a stabilizer-free operation.

- Price: ₹ 22,899
- Colour: Dazzle Steel
- Energy Efficiency: 3-star

- Annual Energy Consumption: 182 Kilowatt hours
- Capacity: 258 litres
- Fresh Food Capacity: 190 litres
- Freezer Capacity: 68 litres
- Installation Type: Free-Standing
- Material: Steel
- Defrost System: Frost free
- Weight: 53 kg
- Warranty: 10 Years warranty on Compressor & fan motor, 1-year warranty on the product

Pros	Cons
Economical; Stylish	Not suitable for large families
Consumes less energy	Small storage capacity as compared to other products on this list
Twin inverter technology	
Turbo icing technology	

## 2. Lloyd 310 L 2 Star Inverter Frost Free Double Door Refrigerator

Lloyd is a well-known brand that almost every Indian has owned at one time or another. The company, which specialises in electrical appliances, is recognised for producing high-quality refrigerators with useful features and, most importantly, at affordable prices.

The Lloyd 310 L 2 Star Inverter Frost Free Double Door Refrigerator has smart inverter technology, which uses a variable-speed compressor to adapt the cooling according to the refrigerator's demands. As a consequence, it saves energy and lasts a long time.

The fridge also has advanced features including automatic defrost cycles with adaptive patterns that optimise cooling and energy efficiency. It incorporates shelves with built-in air vents to provide consistent cooling in each compartment, as well as exclusive cool shower technology.

Furthermore, owing to the refrigerator's six different modes, the freezer may be used in a number of ways depending on the load and items placed in it. As a consequence, uniform cooling in the freezer and refrigerator is achieved, guaranteeing that the food stays fresh. Last but not least, the refrigerator has a large vegetable tray with a 27-litre storage capacity.

- **Price**: ₹ 23,490
- Colour: Black
- Energy Efficiency: 2-star
- Annual Energy Consumption: 200 Kilowatt-hours
- Capacity: 310 litres
- Fresh Food Capacity: 235 litres
- Freezer Capacity: 75 litres
- Installation Type: Free-Standing
- Material: Steel
- Defrost System: Frost free
- Weight: 57 kg
- Warranty: 1 Year on Product, 10 Years on Compressor

Pros	Cons
The product features a convertible freezer technology with 6 in 1 mode	The product creates a little noise while running
Intelligent inverter technology allows a smooth operation	The storage capacity of the refrigerator is very less
Patented cool shower technology that keeps the content fresh	
Large vegetable tray with 27 litres of storage space	

3. LG 260L 3 Star Smart Inverter Frost-Free Double Door Refrigerator

LG is one of the most popular refrigerator brands in India. This LG double door fridge has a capacity of 260 litres and features a smart inverter compressor. The smart inverter compressor is energy efficient and provides less noise. Additionally, it is more durable than other compressors. The trimless tempered glass shelves give it a sleek look and make it easy to clean. The fridge also features door cooling+, express freeze, and smart connect. The chiller zone is perfect for storing beverages and the deodorizer keeps the fridge smelling fresh. The LG double-door fridge is a great option for small families or bachelors.

#### Features :

- Auto defrost function to prevent ice-build up
- Capacity 260 L: Suitable for small families and bachelor
- I freezer capacity: 75L, fresh food capacity: 185L
- Energy Rating: 3 Star
- Warranty: 1 year on product,10 years on compressor
- Smart inverter compressor energy efficient, less noise & more durable
- Shelf Type: Trimless tempered Glass no. of Shelves: 03 TOP LED: Energy Efficient & Longer Life Span
- Also included in the box: Unit of Refrigerator and unit user manual
- Special Features: Door Cooling+, Temp. Control: Display I Micom, Express Freeze, Works without Stabilizer (100-310V), Smart Diagnosis, Smart Connect, Jet Ice, Chiller Zone
- Deodorizer: Catechin, Multi Air Flow, Anti-Bacterial gasket, Moist 'N' Fresh, Humidity Controller, Vegetable box with 29. L capacity.

Pros	Cons
Efficient and durable compressor	No cons as such!
Trimless tempered glass shelves for a sleek look	
Door cooling+ feature keeps the fridge cool	
Deodorizer keeps the fridge smelling fresh	
Sleek design	
Express freeze	
Easy to clean	
Less noise	
Chiller zone is perfect storing for beverages	

## 4. Whirlpool 265 L 3-star Inverter Frost-Free Double Door Refrigerator (INTELLIFRESH INV CNV 278 3S, German Steel, Convertible)

Whirlpool is another leading brand that has been owned in every Indian household at least once. Their refrigerators are perfect blends of design, reasonable pricing, and usefulness. The brand is known for its excellent customer service and high warranty periods.

The Whirlpool 265 L 3-stars rated refrigerator features a modish design and comes with adaptive intelligence that analyzes data continuously to ensure proper cooling for a long time. Also, the advanced IntelliSense inverter technology adapts the cooling according to the internal load with less energy consumption giving you a matchless performance.

Furthermore, you can get up to 15 days of garden freshness with its Advanced Zeolite technology. The refrigerator has a vegetable crisper with honeycomb moisture lock-in technology that condenses the evaporated moisture to provide freshness and uniform air. Lastly, the freshener also helps in reducing oxidation and maintaining the freshness of fruits and vegetables.

- Price: ₹ 25,990
- Colour: Grey
- Energy Efficiency: 3-star
- Annual Energy Consumption: 190 Kilowatt hours
- Capacity: 265 litres
- Fresh Food Capacity: 184 litres
- Freezer Capacity: 75 litres
- Installation Type: Free-Standing
- Material: Steel
- Defrost System: Frost free
- Weight: 56 kg
- Warranty: 1 Year on Product, 10 Years on Compressor

Pros	Cons
3-star rated	Not a truly convertible refrigerator
Adaptive intelligence; High capacity	Неаvy
Intellisense inverter technology	
Honeycomb moisture lock-in technology	

## **5.** Samsung **253L 3** Star Inverter Frost Free Double Door Refrigerator

The Samsung 253L Inverter Frost Free Double Door Refrigerator is one of the best refrigerators in India. It has a capacity of 253L and is suitable for families with two to three members or bachelors. The refrigerator comes with a digital inverter compressor which makes it more energy efficient and also has a ten-year warranty on the compressor. The fridge also features a convertible three-in-one up to 88L extra storage option which makes it more versatile. Other features include a voltage range of 100V-300V, stabilizer free operation, digital display, fresh room, and deodorizer.

#### Features :

- Capacity 253 litres
- Suitable for families with two to three members or bachelor
- Energy rating: 3 Star
- Digital inverter compressor
- Ten year warranty on compressor, 1 year on product
- Convertible three-in-one up to 88L extra storage option
- Voltage range of 100V–300V
- Stabilizer free operation
- Digital display
- Fresh room
- Deodorizer

Pros	Cons
Energy efficient	None
More storage options	
Stabilizer free operation	
Has a digital display	
Long warranty on compressor	

## 6. Bosch 559 L 2 Star Inverter Frost Free Double Door Refrigerator

Another famous refrigerator brand in India is Bosch, which is known for its classic design and high functionality. The firm takes pride in offering exceptional customer service as well as developing high-quality home appliances.

One of the most elegant and modern-looking double-door refrigerators on our list is the Bosch 559 L 2 Star Refrigerator. This refrigerator, with a capacity of 559 litres, is ideal for a household of six to eight. Rapid cooling technology ensures consistent cooling by blasting cool air at every shelf level. Furthermore, the refrigerator's electric fans evenly disperse cool air throughout the freezer, preventing ice from forming.

The R600A refrigerant, which comprises cold gases that travel from one point to another to release heat outdoors, is also used in the Bosch frost-free refrigerator. Finally, it has a humidity controller vegetable box that helps moderate the airflow inside the box, ensuring that the food stays fresh and clean.

- Price: ₹ 71,799
- Colour: Black
- Energy Efficiency: 2-star
- Capacity: 559 litres
- Installation Type: Free-Standing
- Material: Steel
- Defrost System: Automatic
- Weight: 68 kg
- Warranty: 1 Year on Product, 10 Years on Compressor

Pros	Cons
The product is highly spacious and features a classic design	The product creates a little noise while running
The quick cooling technology and automatic defrosting makes it stand out from the competitors	A very heavy-weighted product that is difficult to move around
Nature-friendly refrigerant is used in this product	
There is a humidity controller vegetable box	
	·

## 7. Godrej 236 L 2 Star Inverter Frost-Free Double Door Refrigerator

The Best Refrigerator Brand in India according to us is Godrej. Some of the unique selling points for this brand are, A auto defrost function to prevent ice-build up. The Capacity of 236 litres is suitable for families with two to three members. An energy rating of two stars and annual energy consumption of 243 Kilowatt hours. A manufacturer warranty of one year for the product and ten years for the compressor. An inverter compressor is energy efficient, has silent operation and is more durable. Toughened glass shelves are included as well as a jumbo vegetable tray, anti-bacterial gasket, widest shelves and large freezer space.

#### Features :

- Capacity 236 litres
- Energy rating: two stars
- Annual energy consumption: 243 Kilowatt hours
- Manufacturer warranty: one year for the product; ten years for the compressor
- Inverter Compressor Energy efficient, silent operation & more durable
- Shelf type: toughened glass shelves
- Included in the box: Refrigerator, User Manual, Warranty Card
- Special Features: Jumbo vegetable tray, Anti-Bacterial gasket, Toughened Ten years for the compressor.

May be too big for some families

### 8. CROMA 170 L 2 Star 2020 Direct Cool Single Door Refrigerator

Despite its reputation for high-quality culinary goods, Croma is a reliable brand for home equipment, particularly refrigerators. Despite the fact that Croma refrigerators are somewhat more expensive than their competitors, you can be confident that you're making a prudent one-time investment!

The Croma 170 L frost-free refrigerator boasts a traditional design and an energy-efficient VarioInverter compressor that varies compressor speed dependent on the refrigerator's current interior and outside conditions.

An interior temperature sensor, a defrost system, a door sensor, an ambient sensor, and a voltage sensor are among the six energy-saving smart sensors included. In addition, the refrigerator contains an LED light illuminator that lasts longer than ordinary light bulbs.

PUF insulation is also used in this refrigerator, which assists in the effective preservation of low temperatures for better cooling. In addition, the refrigerator has the unique ability to prevent temperature variations by delivering efficient and regular air circulation across all compartments.

- Price: ₹ 11,990
- Colour: Metallic
- Energy Efficiency: 2-star
- Annual Energy Consumption: 200 Kilowatt-hours
- Capacity: 170 litres
- Fresh Food Capacity: 150 litres
- Freezer Capacity: 20 litres
- Installation Type: Free-Standing
- Material: Stainless-Steel
- Defrost System: Frost free
- Weight: 35.7 kg
- Warranty: 1 Year on Product, 10 Years on Compressor

Pros	Cons
The refrigerator consumes comparatively less energy	The after-sales service of the product is not very satisfactory
It has a classic design and is highly spacious	The product is very heavy to move around
The fridge remains cool for 16 hours	The product has only a 2-star rating
There are intelligent sensors for increased efficiency	

## 9. Samsung 415L 3-star Inverter Frost Free Double Door Refrigerator (RT42M553ES8/TL, Elegant Inox, Convertible)

Samsung is one of the leading manufacturers of electrical appliances and no doubt, their refrigerators are also the best. The brand provides a high warranty, exceptional customer support, intriguing designs, and functional features. Samsung has a wide range of refrigerators developed with the latest technology in a range of sizes and designs.

The Samsung 415 L 3-star frost-free double door refrigerator is an Amazon bestseller that is available in two size options viz. 394 L and 415 L. The refrigerator is backed by digital inverter technology that allows precise cooling and keeps the food fresh for a long time. The freshest zone is a smart design drawer that caters to the need of storing perishable food.

This 5-in-1 convertible refrigerator is powered by twin cooling plus technology that takes care of your everyday needs and gives you 2 times longer freshness. Moreover, the power freeze option at the touch of a button allows it to make ice 31% faster than other refrigerators. Also, there is a door alarm that rings whenever the door is not locked properly.

- Price: ₹ 43,990
- Colour: Elegant Inox
- Energy Efficiency: 3-star
- Annual Energy Consumption: 258 Kilowatt hours
- Capacity: 415 litres
- Fresh Food Capacity: 295 litres
- Freezer Capacity: 89 litres
- Installation Type: Free-Standing
- Material: Steel
- Defrost System: Frost Free
- Weight: 71.6 kg
- Warranty: 1 Year on Product, 10 Years on Compressor

Cons
Неаvy
Expensive

## **10.** AmazonBasics 564 L Side-by-Side Door Refrigerator (Silver Steel Finish) -

Although some people are sceptical about AmazonBasics due to its low pricing, the brand is worth considering due to its classic design and interesting features. The warranty offered by AmazonBasics is low as compared to the other established brands but its customer service is highly satisfactory. Most importantly, the brand launches highly functional and economical products with a long life.

The Amazon Basic 564 L side-by-side frost-free refrigerator is the only variant of its kind on this list. A perfect choice for a large-sized family with no budget constraints and plenty of space, this refrigerator is sure to enhance the interiors of any kitchen. Available in three size options viz. 468 L, 564 L and 670 L, you get two colour choices with this classic refrigerator.

It comes with Auto Defrost technology that prevents it from building up extra ice automatically. Highly spacious and stylish, this fridge can meet the everyday requirements of your family members. Its left side is a freezer whereas the right one is a regular fridge. Furthermore, the refrigerator comes with multiple shelves and pull-out drawers for surplus storage and easy access.

The Multi airflow system is responsible for smooth airflow in the storage compartment for uniform cooling. The refrigerator has a unique feature of an LED display panel that helps in controlling the temperature easily. Although expensive, this refrigerator comes with energy-efficient technology that reduces consumption, making it lighter on the pocket in the long run.

Also, the quick freeze feature of the refrigerator converts water into ice and the quick cool feature keeps your food fresh and hygienic for a longer period. Moreover, it has a child lock option that prevents accidental settings changes on its control panel. Last but not least, it is also equipped with a door alarm that alerts you in case the door is accidentally left open.

- **Price**: ₹ 47,499
- Colour: Sapphire Magnolia
- Energy Efficiency: 4 Star
- Capacity: 564 litres
- Installation Type: Free-Standing
- Material: Steel with glass finish
- Defrost System: Automatic
- Weight: 91 kg
- Warranty: 1 Year on Product, 5 Years on Compressor

Pros	Cons
Energy-efficient; High storage capacity	Expensive
Super freeze technology; Economical as compared to other side by side door refrigerators available in the market	Heavy
LED display with touch button; Child lock and alarm	Limited five years warranty on the compressor
Adjustable thermostat feature	

## **3.3.2** List installation-site requirements such as structural requirements, ventilation, etc.

Here are the 4 essential requirements that you need to meet to flawlessly install your fridge – both commercial as well as domestic.

#### **Requirements Related to Power**

- The fridge must be installed close enough to any power outlet so that the plug can access it without any difficulty. Make sure there is no tension on the power cord.
- Ensure that eh fridge is not accidentally switched off. Hence, connect the appliance to an exclusive power point. Never connect any other appliance using a multi-plug socket or extension cords.
- Make sure that your fridge is properly earthed or grounded. In many cases, customers are found wanting in this area and this leads to a series of power-related issues that knock the appliance out of order, raising the needs for fridge repairs and some unnecessary expenses

#### **Location-related Requirements**

- Do not install the fridge at a location, from where it will receive direct sunlight.
- Also, make sure you do not set it up close to any heat generating gadgets like a cooktop or a dishwasher.

In both cases, the sunlight and the heat will thwart the cooling effort of the fridge to a considerable extent. This means the condenser will have to extra hard to keep things cool and will hence, the fridge will consume more energy. The life of the fridge will drastically reduce.

#### The Stability Factor

This is a simple, yet important factor that people have to consider while installing their fridge. It is essential to make sure that all the 4 corners of your fridge and its base steadily supported rest on the surface after the fridge is set up. This will ensure there is no movement of the cabinet. Installation of the fridge on an uneven or soft floor will cause the cabinet to twist and dislocation of the door seal. This will allow the entry of warm air, causing the temperature to rise and spoil the foodstuff inside.

One has to make sure that the front leveling foot at the hinge side takes the lion's share of the cabinet's weight. This will stabilize the cabinet and it will not shudder or wobble when the fridge runs and the motor is turned off and on by the preprogrammed thermostat.

#### Here are a few important tips for moving the refrigerator safely:

- Unpack the refrigerator outside, where there's plenty of room. Remove the interior shelves, drawers, and extra packaging to avoid moving the extra weight.
- It's also a good idea to remove the refrigerator doors entirely to both lighten the total weight and to prevent accidents if they aren't secured properly. Check the manufacturer's recommendations regarding the water supply lines before removing doors if there's an indoor dispenser.
- Always team-move refrigerators with the help of at least two adults.
- Always move a refrigerator using a dolly, hand truck, or other furniture movers.
- Protect and secure the refrigerator properly. This requires using towels or blankets to protect the sides from the hand truck, as well as strapping the appliance to the dolly securely.
- When moving the dolly, keep it at a 45-degree angle to best distribute the weight and avoid hurting yourself. Have a spotter to help keep the refrigerator balanced and centered on the hand truck.
- Always clear the path to the kitchen ahead of time. This includes preparing steps and stairs with ramps to help lift the hand truck between levels. It's best to walk backward when moving the dolly up an incline.
- Protect the floors with plywood, cardboard, or towels to avoid scratching or damaging the floor.

## Unit 3.4 Refrigeration cycle & Method of refrigeration

## Unit Objectives 🞯

By the end of this unit, participants will be able to:

- Explain the refrigeration cycle and functioning of the appliance and its various modules, including various electromechanical parts of the refrigerator.
- Describe the method of refrigeration, its use and functioning of refrigerator sealed system.

# **3.4.1** Explain the refrigeration cycle and functioning of the appliance and its various modules, including various electromechanical parts of the refrigerator and method of refrigeration

Methods of refrigeration can be classified as non-cyclic, cyclic, thermoelectric and magnetic.

#### Non-cyclic refrigeration

This refrigeration method cools a contained area by melting ice, or by sublimating dry ice. Perhaps the simplest example of this is a portable cooler, where items are put in it, then ice is poured over the top. Regular ice can maintain temperatures near, but not below the freezing point, unless salt is used to cool the ice down further (as in a traditional ice-cream maker). Dry ice can reliably bring the temperature well below water freezing point.

#### Cyclic refrigeration

This consists of a refrigeration cycle, where heat is removed from a low-temperature space or source and rejected to a high-temperature sink with the help of external work, and its inverse, the thermodynamic power cycle. In the power cycle, heat is supplied from a high-temperature source to the engine, part of the heat being used to produce work and the rest being rejected to a low-temperature sink. This satisfies the second law of thermodynamics.

A *refrigeration cycle* describes the changes that take place in the refrigerant as it alternately absorbs and rejects heat as it circulates through a refrigerator. It is also applied to heating, ventilation, and air conditioning HVACR work, when describing the "process" of refrigerant flow through an HVACR unit, whether it is a packaged or split system.

Heat naturally flows from hot to cold. Work is applied to cool a living space or storage volume by pumping heat from a lower temperature heat source into a higher temperature heat sink. Insulation is used to reduce the work and energy needed to achieve and maintain a lower temperature in the cooled space. The operating principle of the refrigeration cycle was described mathematically by Sadi Carnot in 1824 as a heat engine.

The most common types of refrigeration systems use the reverse-Rankine vapor-compression refrigeration cycle, although absorption heat pumps are used in a minority of applications.

Cyclic refrigeration can be classified as:

- 1. Vapor cycle, and
- 2. Gas cycle

Vapor cycle refrigeration can further be classified as:

- 1. Vapor-compression refrigeration
- 2. Sorption Refrigeration
  - 1. Vapor-absorption refrigeration
  - 2. Adsorption refrigeration

#### Vapor-compression cycle

The vapor-compression cycle is used in most household refrigerators as well as in many large commercial and industrial refrigeration systems. Figure 1 provides a schematic diagram of the components of a typical vapor-compression refrigeration system.

In this cycle, a circulating refrigerant such as a low boiling hydrocarbon or hydrofluorocarbons enters the compressor as a vapour. From point 1 to point 2, the vapor is compressed at constant entropy and exits the compressor as a vapor at a higher temperature, but still below the vapor pressure at that temperature. From point 2 to point 3 and on to point 4, the vapor travels through the condenser which cools the vapour until it starts condensing, and then condenses the vapor into a liquid by removing additional heat at constant pressure and temperature. Between points 4 and 5, the liquid refrigerant goes through the expansion valve (also called a throttle valve) where its pressure abruptly decreases, causing flash evaporation and auto-refrigeration of, typically, less than half of the liquid.

That results in a mixture of liquid and vapour at a lower temperature and pressure as shown at point 5. The cold liquid-vapor mixture then travels through the evaporator coil or tubes and is completely vaporized by cooling the warm air (from the space being refrigerated) being blown by a fan across the evaporator coil or tubes. The resulting refrigerant vapour returns to the compressor inlet at point 1 to complete the thermodynamic cycle.

The above discussion is based on the ideal vapour-compression refrigeration cycle, and does not take into account real-world effects like frictional pressure drop in the system, slight thermodynamic irreversibility during the compression of the refrigerant vapor, or non-ideal gas behavior, if any. Vapor compression refrigerators can be arranged in two stages in cascade refrigeration systems, with the second stage cooling the condenser of the first stage. This can be used for achieving very low temperatures.

#### Absorption cycle

In the early years of the twentieth century, the vapor absorption cycle using water-ammonia systems or LiBr-water was popular and widely used. After the development of the vapor compression cycle, the vapor absorption cycle lost much of its importance because of its low coefficient of performance (about one fifth of that of the vapor compression cycle). Today, the vapor absorption cycle is used mainly where fuel for heating is available but electricity is not, such as in recreational vehicles that carry LP gas. It is also used in industrial environments where plentiful waste heat overcomes its inefficiency.

The absorption cycle is similar to the compression cycle, except for the method of raising the pressure of the refrigerant vapor. In the absorption system, the compressor is replaced by an absorber which dissolves the refrigerant in a suitable liquid, a liquid pump which raises the pressure and a generator which, on heat addition, drives off the refrigerant vapor from the high-pressure liquid. Some work is needed by the liquid pump but, for a given quantity of refrigerant, it is much smaller than needed by the compressor in the vapor compression cycle. In an absorption refrigerator, a suitable combination of refrigerant and absorbent is used. The most common combinations are ammonia (refrigerant) with water (absorbent), and water (refrigerant) with lithium bromide (absorbent).

#### Adsorption cycle

The main difference with absorption cycle, is that in adsorption cycle, the refrigerant (adsorbate) could be ammonia, water, methanol, etc., while the adsorbent is a solid, such as silica gel, activated carbon, or zeolite, unlike in the absorption cycle where absorbent is liquid.

The reason adsorption refrigeration technology has been extensively researched in recent 30 years lies in that the operation of an adsorption refrigeration system is often noiseless, non-corrosive and environment friendly.

#### Gas cycle

When the working fluid is a gas that is compressed and expanded but doesn't change phase, the refrigeration cycle is called a *gas cycle*. Air is most often this working fluid. As there is no condensation and evaporation intended in a gas cycle, components corresponding to the condenser and evaporator in a vapor compression cycle are the hot and cold gas-to-gas heat exchangers in gas cycles.

The gas cycle is less efficient than the vapor compression cycle because the gas cycle works on the reverse Brayton cycle instead of the reverse Rankine cycle. As such, the working fluid does not receive and reject heat at constant temperature. In the gas cycle, the refrigeration effect is equal to the product of the specific heat of the gas and the rise in temperature of the gas in the low temperature side. Therefore, for the same cooling load, a gas refrigeration cycle needs a large mass flow rate and is bulky.

Because of their lower efficiency and larger bulk, *air cycle* coolers are not often used nowadays in terrestrial cooling devices. However, the air cycle machine is very common on gas turbine-powered jet aircraft as cooling and ventilation units, because compressed air is readily available from the engines' compressor sections. Such units also serve the purpose of pressurizing the aircraft.

#### Thermoelectric refrigeration

Thermoelectric cooling uses the Peltier effect to create a heat flux between the junction of two types of material. This effect is commonly used in camping and portable coolers and for cooling electronic components and small instruments. Peltier coolers are often used where a traditional vapor-compression cycle refrigerator would be impractical or take up too much space, and in cooled image sensors as an easy, compact and lightweight, if inefficient, way to achieve very low temperatures, using two or more stage peltier coolers arranged in a cascade refrigeration configuration, meaning that two or more Peltier elements are stacked on top of each other, with each stage being larger than the one before it, in order to extract more heat and waste heat generated by the previous stages. Peltier cooling has a low COP (efficiency) when compared with that of the vapor-compression cycle, so it emits more waste heat (heat generated by the Peltier element or cooling mechanism) and consumes more power for a given cooling capacity.

#### Magnetic refrigeration

Magnetic refrigeration, or adiabatic demagnetization, is a cooling technology based on the magnetocaloric effect, an intrinsic property of magnetic solids. The refrigerant is often a paramagnetic salt, such as cerium magnesium nitrate. The active magnetic dipoles in this case are those of the electron shells of the paramagnetic atoms.

A strong magnetic field is applied to the refrigerant, forcing its various magnetic dipoles to align and putting these degrees of freedom of the refrigerant into a state of lowered entropy. A heat sink then absorbs the heat released by the refrigerant due to its loss of entropy. Thermal contact with the heat sink is then broken so that the system is insulated, and the magnetic field is switched off. This increases the heat capacity of the refrigerant, thus decreasing its temperature below the temperature of the heat sink.

Because few materials exhibit the needed properties at room temperature, applications have so far been limited to cryogenics and research.

#### Other methods

Other methods of refrigeration include the air cycle machine used in aircraft; the vortex tube used for spot cooling, when compressed air is available; and thermoacoustic refrigeration using sound waves in a pressurized gas to drive heat transfer and heat exchange; steam jet cooling popular in the early 1930s for air conditioning large buildings; thermoelastic cooling using a smart metal alloy stretching and relaxing. Many Stirling cycle heat engines can be run backwards to act as a refrigerator, and therefore these engines have a niche use in cryogenics. In addition, there are other types of cryocoolers such as Gifford-McMahon coolers, Joule-Thomson coolers, pulse-tube refrigerators and, for temperatures between 2 mK and 500 mK, dilution refrigerators.

### **Unit 3.5 Refrigerants**

## Unit Objectives 🚳

By the end of this unit, participants will be able to:

• Explain types of refrigerants such as R12, R22, R134a, R290, R600a, R410, R32, use of different brazing sticks, types of brazing torches, fluxes and their application.

## 3.5.1 Explain types of refrigerants such as R12, R22, R134a, R290, R600a, R410, R32, use of different brazing sticks, types of brazing torches, fluxes and their application

A refrigerant is a working fluid used in the refrigeration cycle of air conditioning systems and heat pumps where in most cases they undergo a repeated phase transition from a liquid to a gas and back again. Refrigerants are heavily regulated due to their toxicity, flammability and the contribution of CFC and HCFC refrigerants to ozone depletion and that of HFC refrigerants to climate change.

#### > Desirable properties

The ideal refrigerant would be: non-corrosive, non-toxic, non-flammable, with no ozone depletion and global warming potential. It should preferably be natural with well-studied and low environmental impact. It also needs to have: a boiling point that is somewhat below the target temperature (although boiling point can be adjusted by adjusting the pressure appropriately), a high heat of vaporization, a moderate density in liquid form, a relatively high density in gaseous form (which can also be adjusted by setting pressure appropriately), and a high critical temperature. Extremely high pressures should be avoided. Newer refrigerants address the issue of the damage that CFCs caused to the ozone layer and the contribution that HCFCs make to climate change, but some do raise issues relating to toxicity and / or flammability.

#### Common refrigerants

#### Refrigerants with very low climate impact

With increasing regulations, refrigerants with a very low global warming potential are expected to play a dominant role in the 21st century, in particular R-290 and R-1234yf. Starting from almost no market share in 2018, low GWPO devices are gaining market share in 2022.

Table 3.5.1 sho	owing refrige	erants properties				
Code	Chemical	Name	GWP 20yr <sup>[</sup>	G W P 100yr	Status	Commentary
R-290	C <sub>3</sub> H <sub>8</sub>	Propane		3.3	increasing use	Low cost, widely available and efficient. They also have zero ozone depletion potential. Despite the flammability, they are increasingly used in domestic refrigerators and heat pumps. In 2010, about one-third of all household refrigerators and freezers manufactured globally used isobutane or an isobutane/propane blend, and this was expected to increase to 75% by 2020.
R-600a	HC(CH <sub>3</sub> ) <sub>3</sub>	Isobutane		3.3	Widely used	See R-290.
R-717	NH <sub>3</sub>	Ammonia	0	0	W i d e l y used	Commonly used before the popularisation of CFCs it is again being considered, but does suffer from the disadvantage of toxicity, and requiring corrosion resistant components, which restricts its domestic and small-scale use. Anhydrous ammonia is widely used in industrial refrigeration applications and hockey rinks because of its high energy efficiency and low cost.

R-1234yf HFO- 1234yf	C <sub>3</sub> H <sub>2</sub> F <sub>4</sub>	2 , 3 , 3 , 3 - Tetrafluoropro- pene		<1		Less performance but also less flammable than R-290. GM announced that it would start using "hydrofluoroolefin", HFO- 1234yf, in all of its brands by 2013.
R-744	CO2	Carbon dioxide	1	1	in use	Was used as a refrigerant prior to the discovery of CFCs (this was also the case for propane) and now having a renaissance due to it being non- ozone depleting, non- toxic and non-flammable. It may become the working fluid of choice to replace current HFCs in cars, supermarkets, and heat pumps. Coca- Cola has fielded CO <sub>2</sub> - b as ed b e v er a g e coolers and the U.S. Army is considering CO <sub>2</sub> refrigeration. Due to the need to operate at pressures of up to 130 bars (1,900 psi; 13,000 kPa), CO <sub>2</sub> systems require highly resistant components, however these have already been developed for mass production in many sectors.

#### Most used

Code	Chemical	Name	Global warming potential 20yr <sup>[</sup>	G W P 100yr	Status	Commentary
R-32 HFC-32	CH <sub>2</sub> F <sub>2</sub>	Difluoromethane	2430	677	W i d e l y used	Promoted as climate-friendly substitute for R-134a and R-410a, but still with high climate impact. Has excellent heat transfer and pressure drop performance, both in condensation and vaporisation. It has a atmospheric lifetime of nearly 5 years. Currently used in residential and commercial air- conditioners and heat pumps.
R-134a HFC- 134a	CH <sub>2</sub> FCF <sub>3</sub>	1,1,1,2-Tetrafluo- roethane	3790	1550	W i d e l y used	Most used in 2020 for hydronic heat pumps in Europe and USA in spite of high GWP.
R-410a		5 0 % R - 3 2 / 5 0 % R - 1 2 5 (pentafluoroethane)	(R-32) and 6350	>677	Widely Used	Most used in split heat pumps / AC by 2018. Almost 100% share in the USA.

#### Banned / Phased out

Code	Chemi- cal	Name	Global warming poten- tial 20yr	G W P 100yr <sup>[</sup>	Sta- tus	Commentary
R-11 CFC- 11	CCl <sub>3</sub> F	Trichlorofluor- omethane	6900	4660	Banned	Production was banned in developed coun- tries by Montreal Protocol in 1996
R-12 CFC- 12	CCl <sub>2</sub> F <sub>2</sub>	Dichlorodifluo- romethane	10800	10200	Banned	Also known as Freon, a widely used chloro- fluorocarbon halomethane (CFC). Production was banned in developed countries by Mon- treal Protocol in 1996, and in developing countries (article 5 countries) in 2010.
R-22 HCFC- 22	CHCIF <sub>2</sub>	Chlorodifluo- romethane	5280	1760	B e i n g phased out	A widely used hydrochlorofluorocar- bon (HCFC) and powerful greenhouse gas with a GWP equal to 1810. Worldwide production of R-22 in 2008 was about 800 Gg per year, up from about 450 Gg per year in 1998. R-438a (MO-99) is a R-22 replacement.
R - 1 2 3 HCFC-123	CHCl <sub>2</sub> CF <sub>3</sub>	2 , 2 - D i - chloro-1,1,1-tri- fluoroethane	292	79	U S phase- out	Used in large tonnage centrifugal chiller applications. All U.S. production and import of virgin HCFCs will be phased out by 2030, with limited exceptions. <sup>I</sup> R-123 refrigerant was used to retrofit some chiller that used R-11 refrigerant Trichlorofluoromethane. The production of R-11 was banned in developed countries by Montreal Protocol in 1996.

#### Other

Code	Chemical	Name	Global warming potential 20yr	G W P 100yr	Commentary
R-152a					
H F C - 152a	CH <sub>3</sub> CHF <sub>2</sub>	Difluoroethane	506	138	as a compressed air duster.
R-407c		Mixture of difluoromethane and pentafluoroethane and 1,1,1,2-tetrafluoroethane			a mixture of R-32, R-125, and R-134a
R-454B		Difluoromethane and 2,3,3,3-Tetrafluoropropene			HFOs blend of refrigerants Difluoromethane (R-32) and 2,3,3,3-Tetrafluoropropene (R-1234yf).
R-513A		an HFO/HFC blend (56% R-1234yf/44%R-134a)			may replace R-134a as ar interim alternative
R-514a		HFO-1336mzz-Z/trans-1,2- dichloroethylene (t-CE)			A hydrofluoroolefin (HFO)- based refrigerant to replace R-123 in low pressure centrifugal chillers for commercial and industria applications.
# Unit 3.6 Installation, Fixing accessories & Usage guidelines

# Unit Objectives 🞯

By the end of this unit, participants will be able to:

- Describe manual-based procedure of installing the refrigerators.
- Describe methods of fixing various accessories, parts that have accompanied the unit and their features.
- Explain how to use the appliance and its various features/functionalities after installation.

# **3.6.1** Describe manual-based procedure of installing the refrigerators and fixing various accessories and its usage <sup>-</sup>

## Unpack the fridge outside

The huge cardboard boxes that the fridge was shipped in is easier to open outside, where you have room. Remove the cardboard box and other packing parts and set them aside. Don't throw them out until the refrigerator has been up and running for a few days, though, in case you need to return it for replacement or repair.

Inside the refrigerator, remove all of the shelves, drawers and other components and set them aside so they don't get damaged while installing. However, leave the plastic covering on the refrigerator doors in place: this can protect them from damage as you move them.

### Move the refrigerator

To move a refrigerator, the easiest way is to use a dolly or hand truck, tilting the refrigerator on one side so the weight is balanced on one side. Never put a refrigerator on its side or upside down: this can weaken or damage the cooling mechanism inside. If you need to carry it up stairs, keep it as upright as possible and move carefully to avoid knocking it.

## Take the doors off

Larger refrigerators are especially difficult to move, because they often won't fit through the doorways in your house. There is a hidden trick here, though: all refrigerators are designed to have removable doors. The doors are held in place by bolts at the top and bottom, and can be removed by undoing them. Check the manual for details on this, though: some may require that you remove the bolts in a particular order, or remove other parts (such as water feeder lines) first.

Once the door (or doors) are removed, the refrigerator will be much thinner and easier to move into the kitchen. Once it is installed, you can replace the doors by reversing the sequence and you are good to go.

### Mind the gap

You, of course, measured the space that the refrigerator and bought an appropriately sized one. But it never hurts to double-check: Before you move the refrigerator inside, measure the spot that it is going into, taking note of the depth, height and width. Then compare this with the measurements of the refrigerator itself and air gap that the manufacturer recommends. You'll find this in the manual that came with the refrigerator. This gap allows air to circulate, carrying away the heat that the refrigerator is removing from the food inside. The size of the required gap varies with different models and types of refrigerators, so make sure you check this and have the space you need.

- > Selecting the best location for the refrigerator
  - Select a location with easy access to the water supply.
  - Select a location without direct exposure to sunlight.
  - Select a location with level (or nearly level) flooring.
  - Select a location with enough space for the refrigerator doors to open easily.
  - Allow sufficient space to install the refrigerator on a flat surface.
  - If your refrigerator is not level, the internal cooling system may not work correctly.
  - Overall space required in use. Refer to drawing and dimension as below.
  - Allow clearance to the right, left, back and top when installing. This will help reduce power consumption and keep your energy bills lower.
  - Do not install the refrigerator where the temperature will go below 50°F (10°C).
  - Make sure you disconnect the water supply line BEFORE removing the freezer door.

**STEP 1. SELECTING THE BEST LOCATION FOR THE REFRIGERATOR** 

Installing your refrigerator properly ensures its optimum functioning. Follow the simple steps shown

a) Choose a location without direct exposure to **sunlight**. A refrigerator functions efficiently at the room temperature.



Figure 3.6.1(A) Refrigerator location

b) Place the refrigerator near a location with **level flooring**. The location should be with enough space for the refrigerator doors to open easily as shown in the above diagram.

Note:

• If the refrigerator does not have enough space, the **internal cooling system** may not work properly.

• Please ensure that appliance can be moved freely in the event of maintenance & service.

# **STEP 2. LEVELLING THE REFRIGERATOR**

c) Keep the **front** of the appliance slightly higher than the **rear**, so that the door can be opened and closed more easily.



Figure 3.6.1(B) Refrigerator levelling

d) Turn the **left** and **right** adjusting leg in the direction of the **arrow** until the appliance is levelled as shown in the above diagram.

# **STEP 3. INSTALLING THE DOOR HANDLE**

e) Match the **Handle Locking Tabs** installed on the **left** hand side of the door and the handle inserts.



Figure 3.6.1(C) Refrigerator door handle installation

f) Fix the handle by pulling it down or tapping it lightly with a tool like a rubber hammer.



Figure 3.6.1(D) Refrigerator door handle position

Note: Check whether the locking tabs inside the handle are assembled by pulling it up and down.

# **STEP 4 Functioning**

By completing the following steps, the refrigerator should be fully functioning.

- 1. Plug the power cord into the wall socket to turn the refrigerator on.
- 2. Open the door, and check if the interior light lights up.
- 3. Set the temperature to the coldest, and wait for about an hour. Then, the freezer will be slightly chilled, and the motor will run smoothly.
- 4. Wait until the refrigerator reaches the set temperature. Now the refrigerator is ready for use.

# **STEP 5 Final check**

When installation is complete, confirm that:

- The refrigerator is plugged into an electrical outlet and grounded properly.
- The refrigerator is installed on a flat, level surface with a reasonable clearance from the wall or the cabinet.
- The refrigerator is level and is sitting firmly on the floor.
- The door opens and closes freely, and the interior light turns on automatically when you open the door.

## Feature panel

### 1 Fridge / Power Cool

The Fridge button can be used to set the fridge temperature, or to activate/deactivate Power Cool. You can manually adjust the cooling temperature for the fridge. Keep pressing Fridge to select a desired temperature between 1 °C and 7 °C.

Power Cool speeds up the cooling process at maximum fan speed. This is useful to quickly cool food that spoils quickly, or after the door is left open for some time. The fridge keeps running at full speed for several hours and then returns to the previous temperature. Press and hold Fridge for 3 seconds. The corresponding indicator () lights up, and the refrigerator will speed up the cooling process for you.

### 2 Vacation

The Vacation button can be used to activate/deactivate Vacation mode. If you are going on vacation or a business trip, or if you do not intend to use the refrigerator for an extended time, use the Vacation feature. Press and hold Vacation for 3 seconds to turn off the fridge operation with the Vacation indicator () on.

NOTE It is strongly recommended to empty the fridge compartment and make sure the door is closed.

### **3 Freezer / Power Freeze**

The Freezer button can be used to set the freezer temperature, or to activate Power Freeze. Available temperatures are between -15 °C and -23 °C.

Power Freeze speeds up the freezing process at maximum fan speed. The freezer keeps running at full speed for 50 hours and then returns to the previous temperature.

- To activate Power Freeze, press and hold Freezer for 3 seconds. The corresponding indicator
   () lights up, and the refrigerator will speed up the freezing process for you.
- To deactivate, press and hold Freezer for 3 seconds again. The freezer returns to the previous temperature setting.
- To freeze large amounts of food, activate Power Freeze for at least 20 hours before putting food in the freezer.

**NOTE** Using Power Freeze increases power consumption. Make sure you turn it off and return to the previous temperature if you do not intend to use it.

### 4 Ice Maker / Filter Reset \*

Press Ice Maker to turn the ice maker on or off. The ice maker has 2 indicators ( / ) to indicate the operating status.

- When the ice maker operates, the corresponding indicator () turns on.
- When the ice maker is turned off, the corresponding indicator () turns on. In this case, ice making is disabled even if you press the Cubed Ice or Crushed Ice buttons on the dispenser panel. To enable ice making, you must turn the ice maker on.
- When the ice maker is off, pressing the dispenser lever for more than 5 seconds will automatically turn on the ice maker.
- When you turn the ice maker off, you must wait at least 1 minute before you can turn it back on.

CAUTION- If the ice bucket has been removed, you must turn the ice maker off.

NOTE- If the ice maker is turned off, it will turn on if you press and hold the ice lever for more than 5 seconds

After about 6 months (approximately 300 gallons) of using the original water filter, the Filter indicator turns red to remind you that the filter needs to be replaced. The Filter indicator blinks ref for several seconds when you open the door, reminding you that the filter needs to be replaced. If this happens, replace the filter, and press and hold Filter Reset for 3 seconds. The filter indicator will be reset, and the Filter indicator turns off.

NOTE- Some regional areas have relatively large amounts of lime contained in the water. This may reduce the lifecycle of the filter. In these areas, you will have to replace the water filter more often than specified above.

### 5 Door Alarm

You can set the alarm for a reminder. If the door is left open for more than 2 minutes, the alarm will sound with the alarm indicator blinking. The alarm is enabled by factory default. To disable the alarm, press Door Alarm. To enable, press Door Alarm again. If the door is left open for 5 minutes, internal lights (in the fridge and freezer) will blink for 10 seconds and then turn on. This will be repeated every minute for 5 minutes. This is to alert hearing-impaired users that a door is open and it is normal.

### 6 Lock

To prevent accidental setting changes, press and hold Lock for 3 seconds. The main panel will be disabled and the Lock indicator () will turn on. When Lock is on, the indicator blinks if any button on the main panel is pressed. If you press and hold the button again for more than 3 seconds, Lock will be deactivated. However, Lock will be reactivated if no button is pressed within 1 minute.

NOTE Lock on the main panel does not affect the dispenser. The dispenser operates independently and so does the dispenser lever. To lock the dispenser and the dispenser lever, use the Lock function on the dispenser.

# **Unit 3.7 Test equipment's & Safety Precaution**

# Unit Objectives 🞯

By the end of this unit, participants will be able to:

- Explain the use of test equipment and tools such as multi-meter, oscilloscope etc.
- Explain safety precautions/rules, policies, procedures and quality standards to be followed.

# **3.7.1 Explain the use of test equipment and tools such as multi-meter, oscilloscope etc.**

### **Multi-meter**

A **multimeter** is a measuring instrument that can measure multiple electrical properties. A typical multimeter can measure voltage, resistance, and current, in which case it is also known as a **volt-ohm-milliammeter** (**VOM**), as the unit is equipped with voltmeter, ammeter, and ohmmeter functionality. Some feature the measurement of additional properties such as temperature and capacitance.

Analog multimeters use a microammeter with a moving pointer to display readings. **Digital multimeters** (**DMM**, **DVOM**) have numeric displays and have made analog multimeters virtually obsolete as they are cheaper, more precise, and more physically robust than analog multimeters.

### Operation



Figure 3.7.1 (A) A  $4+\frac{1}{2}$ -digit digital multimeter, the Fluke 87V

A multimeter is the combination of a DC voltmeter, AC voltmeter, ammeter, and ohmmeter. An unamplified analog multimeter combines a meter movement, range resistors and switches; VTVMs are amplified analog meters and contain active circuitry.

For an analog meter movement, DC voltage is measured with a series resistor connected between the meter movement and the circuit under test. A switch (usually rotary) allows greater resistance to be inserted in series with the meter movement to read higher voltages. The product of the basic full-scale deflection current of the movement, and the sum of the series resistance and the movement's own resistance, gives the full-scale voltage of the range. As an example, a meter movement that required 1 mA for full-scale deflection, with an internal resistance of 500  $\Omega$ , would, on a 10 V range of the multimeter, have 9,500  $\Omega$  of series resistance.

For analog current ranges, matched low-resistance shunts are connected in parallel with the meter movement to divert most of the current around the coil. Again for the case of a hypothetical 1 mA, 500  $\Omega$  movement on a 1 A range, the shunt resistance would be just over 0.5  $\Omega$ .

Moving coil instruments can respond only to the average value of the current through them. To measure alternating current, which changes up and down repeatedly, a rectifier is inserted in the circuit so that each negative half cycle is inverted; the result is a varying and nonzero DC voltage whose maximum value will be half the AC peak to peak voltage, assuming a symmetrical waveform. Since the rectified average value and the root mean square (RMS) value of a waveform are only the same for a square wave, simple rectifier-type circuits can only be calibrated for sinusoidal waveforms. Other wave shapes require a different calibration factor to relate RMS and average value. This type of circuit usually has fairly limited frequency range. Since practical rectifiers have non-zero voltage drop, accuracy and sensitivity is poor at low AC voltage values.

To measure resistance, switches arrange for a small battery within the instrument to pass a current through the device under test and the meter coil. Since the current available depends on the state of charge of the battery which changes over time, a multimeter usually has an adjustment for the ohm scale to zero it. In the usual circuits found in analog multimeters, the meter deflection is inversely proportional to the resistance, so full-scale will be  $0 \Omega$ , and higher resistance will correspond to smaller deflections. The ohms scale is compressed, so resolution is better at lower resistance values.

Amplified instruments simplify the design of the series and shunt resistor networks. The internal resistance of the coil is decoupled from the selection of the series and shunt range resistors; the series network thus becomes a voltage divider. Where AC measurements are required, the rectifier can be placed after the amplifier stage, improving precision at low range.

Digital instruments, which necessarily incorporate amplifiers, use the same principles as analog instruments for resistance readings. For resistance measurements, usually a small constant current is passed through the device under test and the digital multimeter reads the resultant voltage drop; this eliminates the scale compression found in analog meters, but requires a source of precise current. An autoranging digital multimeter can automatically adjust the scaling network so the measurement circuits use the full precision of the A/D converter.

In all types of multimeters, the quality of the switching elements is critical to stable and accurate measurements. The best DMMs use gold plated contacts in their switches; less expensive meters use nickel plating or none at all, relying on printed circuit board solder traces for the contacts. Accuracy and stability (e.g., temperature variation, or aging, or voltage/current history) of a meter's internal resistors (and other components) is a limiting factor in long-term accuracy and precision of the instrument.

### **Measured values**



Figure 3.7.1 (B) A clamp meter

### Contemporary multimeters can measure many values. The most common are:

- Voltage, alternating and direct, in volts.
- Current, alternating and direct, in amperes.

The frequency range for which AC measurements are accurate is important, depends on the circuitry design and construction, and should be specified, so users can evaluate the readings they take. Some meters measure currents as low as milliamps or even microamps. All meters have a burden voltage (caused by the combination of the shunt used and the meter's circuit design), and some (even expensive ones) have sufficiently high burden voltages that low current readings are seriously impaired. Meter specifications should include the burden voltage of the meter.

• Resistance in ohms.

### Additionally, some multimeters also measure:

- Capacitance in farads, but usually the limitations of the range are between a few hundred or thousand micro farads and a few pico farads. Very few general purpose multimeters can measure other important aspects of capacitor status such as ESR, dissipation factor, or leakage.
- Conductance in siemens, which is the inverse of the resistance measured.
- Decibels in circuitry, rarely in sound.
- Duty cycle as a percentage.
- Frequency in hertz.

Inductance in henries. Like capacitance measurement, this is usually better handled by a purpose designed inductance / capacitance meter.

Temperature in degrees Celsius or Fahrenheit, with an appropriate temperature test probe, often a thermocouple.

### Digital multimeters may also include circuits for:

- Continuity tester; a buzzer sounds when a circuit's resistance is low enough (just how low is enough varies from meter to meter), so the test must be treated as inexact.
- Diodes (measuring forward drop of diode junctions).
- Transistors (measuring current gain and other parameters in some kinds of transistors)
- Battery checking for simple 1.5 V and 9 V batteries. This is a current-loaded measurement, which simulates in-use battery loads; normal voltage ranges draw very little current from the battery.

Various sensors can be attached to (or included in) multimeters to take measurements such as:

- Light level
- Sound pressure level
- Acidity/alkalinity(pH)
- Relative humidity
- Very small current flow (down to nanoamps with some adapters)
- Very small resistances (down to micro ohms for some adapters)
- Large currents adapters are available which use inductance (AC current only) or Hall effect sensors (both AC and DC current), usually through insulated clamp jaws to avoid direct contact with high current capacity circuits which can be dangerous, to the meter and to the operator
- Very high voltages adapters are available which form a voltage divider with the meter's internal resistance, allowing measurement into the thousands of volts. However, very high voltages often have surprising behavior, aside from effects on the operator (perhaps fatal); high voltages which actually reach a meter's internal circuitry may internal damage parts, perhaps destroying the meter or permanently ruining its performance.

### Oscilloscope

- An oscilloscope is a type of electronic test instrument that graphically displays varying electrical voltages as a two-dimensional plot of one or more signals as a function of time. The main purposes are to display repetitive or single waveforms on the screen that would otherwise occur too briefly to be perceived by the human eye. The displayed waveform can then be analyzed for properties such as amplitude, frequency, rise time, time interval, distortion, and others. Originally, calculation of these values required manually measuring the waveform against the scales built into the screen of the instrument. Modern digital instruments may calculate and display these properties directly.
- Oscilloscopes are used in the sciences, medicine, engineering, automotive and the telecommunications industry. General-purpose instruments are used for maintenance of electronic equipment and laboratory work. Special-purpose oscilloscopes may be used to analyze an automotive ignition system or to display the waveform of the heartbeat as an electrocardiogram, for instance.

### Features

- An analog oscilloscope is typically divided into four sections: the display, vertical controls, horizontal controls and trigger controls. The display is usually a CRT with horizontal and vertical reference lines called the graticule. CRT displays also have controls for focus, intensity, and beam finder.
- The vertical section controls the amplitude of the displayed signal. This section has a voltsper-division (Volts/Div) selector knob, an AC/DC/Ground selector switch, and the vertical (primary) input for the instrument. Additionally, this section is typically equipped with the vertical beam position knob.
- The horizontal section controls the time base or "sweep" of the instrument. The primary control is the Seconds-per-Division (Sec/Div) selector switch. Also included is a horizontal input for plotting dual X-Y axis signals. The horizontal beam position knob is generally located in this section.
- The trigger section controls the start event of the sweep. The trigger can be set to automatically restart after each sweep, or can be configured to respond to an internal or external event. The principal controls of this section are the source and coupling selector switches, and an external trigger input (EXT Input) and level adjustment.
- In addition to the basic instrument, most oscilloscopes are supplied with a probe. The probe connects to any input on the instrument and typically has a resistor of ten times the oscilloscope's input impedance. This results in a 0.1 (-10×) attenuation factor; this helps to isolate the capacitive load presented by the probe cable from the signal being measured. Some probes have a switch allowing the operator to bypass the resistor when appropriate.

# Examples of use

Figure 3.7.1 (C) Lissajous figures on an oscilloscope, with 90 degrees phase difference between x and y inputs

One of the most frequent uses of scopes is troubleshooting malfunctioning electronic equipment. For example, where a voltmeter may show a totally unexpected voltage, a scope may reveal that the circuit is oscillating. In other cases the precise shape or timing of a pulse is important.

In a piece of electronic equipment, for example, the connections between stages (e.g., electronic mixers, electronic oscillators, amplifiers) may be 'probed' for the expected signal, using the scope as a simple signal tracer. If the expected signal is absent or incorrect, some preceding stage of the electronics is not operating correctly. Since most failures occur because of a single faulty component, each measurement can show that some of the stages of a complex piece of equipment either work, or probably did not cause the fault.

Once the faulty stage is found, further probing can usually tell a skilled technician exactly which component has failed. Once the component is replaced, the unit can be restored to service, or at least the next fault can be isolated. This sort of troubleshooting is typical of radio and TV receivers, as well as audio amplifiers, but can apply to quite different devices such as electronic motor drives.

Another use is to check newly designed circuitry. Often, a newly designed circuit misbehaves because of design errors, bad voltage levels, electrical noise etc. Digital electronics usually operate from a clock, so a dual-trace scope showing both the clock signal and a test signal dependent upon the clock is useful. Storage scopes are helpful for "capturing" rare electronic events that cause defective operation.

Oscilloscopes are often used during real-time software development to check, among other things, missed deadlines and worst-case latencies.

# **3.7.2** Explain safety precautions/rules, policies, procedures and quality standards to be followed

Before using your new Refrigerator, please read this manual thoroughly to ensure that you know how to operate the features and functions that your new appliance offers safely and efficiently.

### What you need to know about the safety instructions

- Warnings and Important Safety Instructions in this manual do not cover all possible conditions and situations that may occur. It is your responsibility to use common sense, caution, and care when installing, maintaining, and operating your appliance.
- Because these following operating instructions cover various models, the characteristics of your refrigerator may differ slightly from those described in this manual and not all warning signs may be applicable. If you have any questions or concerns, contact your nearest service center or find help and information online at www. samsung.com.
- R-600a or R-134a is used as a refrigerant. Check the compressor label on the rear of the appliance or the rating label inside the fridge to see which refrigerant is used for your appliance. When this product contains flammable gas (Refrigerant R-600a), contact your local authority in regard to safe disposal of this product.
- In order to avoid the creation of a flammable gas-air mixture if a leak in the refrigerating circuit occurs, the size of the room in which the appliance may be sited depends on the amount of refrigerant used.
- Never start up an appliance showing any signs of damage. If in doubt, consult your dealer. The room must be 1 m3 in size for every 8 g of R-600a refrigerant inside the appliance. The amount of refrigerant in your particular appliance is shown on the identification plate inside the appliance.
- Refrigerant squirting out of the pipes could ignite or cause an eye injury. When refrigerant leaks from the pipe, avoid any naked flames and move anything flammable away from the product and ventilate the room immediately.
  - Failing to do so may result in fire or explosion

## Important safety symbols and precautions: WARNING

- When positioning the appliance, ensure the supply cord is not trapped or damaged.
- Do not locate multiple portable socket-outlets or portable power supplies at the rear of the appliance.
- Fill with potable water only.
- Connect to potable water supply only.
- Keep ventilation openings, in the appliance enclosure or in the built-in structure, clear of obstruction.
- Do not use mechanical devices or any other means to accelerate the defrosting process, other than those recommended by the manufacturer.
- Do not damage the refrigerant circuit.
- Do not use electrical appliances inside the food storage compartments of the appliance, unless they are of the type recommended by the manufacturer.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or those who lack experience and knowledge, unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- The socket must be easily accessible so that the appliance can be quickly disconnected from the supply in an emergency.
  - It must be outside the area of the rear of the appliance.

- Do not store explosive substances such as aerosol cans with a flammable propellant in this appliance.
- If the product is equipped with LED lamps, do not disassemble the Lamp Covers and LED lamps yourself.
  - Contact a service center.
  - Use only the LED Lamps provided by the manufacturer or its service agents.
- New hose-sets supplied with the appliance are to be used and old hose-sets should not be reused.
- Have the refrigerator's water supply connected only to a potable water supply. To operate the ice maker properly, water pressure of 206  $\sim$  861 kPa (30  $\sim$  125 psi) is required.
- For the most efficient use of energy, please keep the all inner fittings such as baskets, drawers, shelves on the position supplied by manufacturer.
- To get the best energy efficiency of this product, please leave all shelves, drawers and baskets on their original position.

### > Critical usage warnings

- Do not insert the power plug into a wall socket with wet hands. This may result in an electric shock.
- Do not store articles on the top of the appliance.
  - When you open or close the door, the articles may fall and cause personal injury and/ or material damage.
- Do not insert hands, feet or metal objects (such as chopsticks, etc.) into the bottom or the back of the refrigerator.
  - This may result in an electric shock or injury.
  - Any sharp edges may cause a personal injury.
- Do not touch the inside walls of the freezer or products stored in the freezer with wet hands
  - This may cause frostbite.
- Do not put a container filled with water on the refrigerator.
  - If spilled, there is a risk of fire or electric shock.
- Do not keep volatile or flammable objects or substances (benzene, thinner, propane gas, alcohol, ether, LP gas, and other such products) in the refrigerator.
  - This refrigerator is for storing food only.
  - This may result in fire or explosion.
- Children should be supervised to ensure that they do not play with the appliance.
  - Keep fingers out of "pinch point" areas. Clearances between the doors and cabinet are necessarily small. Be careful when you open the doors if children are in the area.
- Do not put your fingers or children's fingers between the doors.
  - Keep fingers out of the left and right door gaps. Be careful when you open the doors if your fingers are in between the doors.
- Do not let children hang on the door or door bins. A serious injury may occur.
- Do not let children go inside the refrigerator. They could become trapped.
- Do not insert your hands into the bottom area under the appliance.
  - Any sharp edges may cause personal injury.
- Do not store pharmaceutical products, scientific materials, or temperature sensitive products in the refrigerator.
  - Products that require strict temperature controls must not be stored in the refrigerator.

#### **Participant Handbook**

- If you smell pharmaceutical or smoke, pull out power plug immediately and contact your Electronics service center.
- If any dust or water is in Refrigerator, pull out power plug and contact your Electronics service center.
  - Otherwise there is a risk of fire.
- Do not let children step on a drawer.
  - The drawer may break and cause them to slip.
- Do not leave the doors of the refrigerator open while the refrigerator is unattended and do not let children enter inside the refrigerator.
- Do not allow babies or children go inside the drawer. It can cause death from suffocation by entrapment or personal injury.
- Do not overfill the refrigerator with food.
  - When you open the door, an item may fall out and cause personal injury or material damage.
- Do not spray volatile material such as insecticide onto the surface of the appliance.
  - As well as being harmful to humans, it may also result in an electric shock, fire, or problems with the product.
- Never put fingers or other objects into the water dispenser hole, ice chute and ice maker bucket.
  - It may cause a personal injury or material damage.
- Do not use or place any substances sensitive to temperature such as flammable sprays, flammable objects, dry ice, medicine, or chemicals near or inside of the refrigerator.
- Do not use a hair dryer to dry the inside of the refrigerator. Do not place a lighted candle in the refrigerator for removing bad odours.
  - This may result in an electric shock or fire.
- Fill the water tank, ice tray and water cubes only with potable water (mineral water or purified water).
  - Do not fill the tank with tea, juice or sports drink, this may damage the refrigerator.
- Do not stand on top of the appliance or place objects (such as laundry, lighted candles, lighted cigarettes, dishes, chemicals, metal objects, etc.) on the appliance. This may result in an electric shock, fire, problems with the product, or injury. Do not put a container filled with water on the appliance.
  - If spilled, there is a risk of fire or electric shock.

- Never stare directly at the UV LED lamp for long periods of time.
  - This may result in eye strain due to the ultraviolet rays.
- Do not put shelf in upside down. Shelf stopper could not work.
  - It may cause a personal injury because of glass shelf drop.
- Keep fingers out of "pinch point" areas. Clearances between the doors and cabinet are necessarily small. Be careful when you open the doors if children are in the area.
- If a gas leak is detected, avoid any naked flames or potential sources of ignition, and air the room in which the appliance is standing for several minutes.
  - Do not touch the appliance or power cord. Do not use a ventilating fan.
  - A spark may result in explosion or fire.
- Bottles should be stored tightly together so that they do not fall out.
- This product is intended only for the storage of food in a domestic environment.
- Never put fingers or other objects into the water dispenser hole, ice chute and ice maker bucket.
  - It may cause a personal injury or material damage.
- Do not attempt to repair, disassemble, or modify the refrigerator yourself.
- Do not use any fuse (such as cooper, steel wire, etc.) other than a standard fuse.
- If your refrigerator needs to be repaired or reinstalled, contact your nearest service center.
   Failing to do so may result in an electric shock, fire, problems with the product, or injury.
- If the refrigerator emits a burning smell or smoke, unplug the refrigerator immediately and contact your Electronics service center.
  - Failing to do so may result in an electric or fire hazards.
- Pull the power plug out of the socket before changing the interior lamps of the refrigerator.
   Otherwise, there is a risk of electric shock.
- If you experience difficulty changing a non-LED light, contact a service center.
- Plug the power plug into the wall socket firmly.
- Do not use a damaged power plug, damaged power cord or loose wall socket. This may result in an electric shock or fire.

#### Cleaning cautions

- Do not spray water directly on the inside or outside the refrigerator.
  - There is a risk of fire or electric shock.
- Do not use a hair dryer to dry the inside of the refrigerator.
- Do not place a lighted candle in the refrigerator to remove bad odors.
  - This may result in an electric shock or fire.
- Do not spray cleaning products directly on the display.
  - Printed letters on the display may come off.
- If any foreign substance such as water has entered the appliance, unplug the power plug and contact your nearest service center.
  - Failing to do so may result in an electric shock or fire.
- Use a clean, dry cloth to remove any foreign matter or dust from the power plug blades. Do not use a wet or damp cloth when cleaning the plug.
  - Otherwise, there is a risk of fire or electric shock.
- Do not clean the appliance by spraying water directly onto it.
- Do not use benzene, thinner, or Clorox, Chloride for cleaning.
  - They may damage the surface of the appliance and may cause a fire.
- Never put fingers or other objects into the dispenser hole.
  - It may cause a personal injury or material damage.
- Before cleaning or performing maintenance, unplug the appliance from the wall socket.
   Failing to do so may result in an electric shock or fire.
- Use a clean sponge or soft cloth and a mild detergent in warm water to clean the refrigerator.
- Do not use abrasive or harsh cleansers such as window sprays, scouring cleansers, flammable fluids, muriatic acid, cleaning waxes, concentrated detergents, bleaches, or cleansers containing petroleum products on exterior surfaces (doors and cabinet), plastic parts, door and interior liners, and gaskets.
  - These can scratch or damage the material.
- Do not clean glass shelves or covers with warm water when they are cold. Glass shelves and covers may break if exposed to sudden temperature changes or impacts such as bumping or dropping.

# **Unit 3.8 Fundamental of Electricity**

# Unit Objectives

By the end of this unit, participants will be able to:

- Explain the fundamentals of electricity such as ohms law, difference between ac and dc, understanding of domestic wiring, understanding of series and parallel connections.
- Explain basic knowledge of components such as diode, transformer, LED, photo transistor, capacitor, thermistor ICs etc.

# **3.8.1** Explain the fundamentals of electricity such as ohms law, difference between ac and dc, understanding of domestic wiring, understanding of series and parallel connections

# **Ohms law**

The relationship between Voltage, Current and Resistance in any DC electrical circuit was firstly discovered by the German physicist Georg Ohm.



fig. 3.8.1 ohm law

Georg Ohm found that, at a constant temperature, the electrical current flowing through a fixed linear resistance is directly proportional to the voltage applied across it, and also inversely proportional to the resistance. This relationship between the Voltage, Current and Resistance forms the basis of **Ohms Law** and is shown below.

## **Ohms Law Relationship**

 $Current, (I) = \frac{Voltage, (V)}{Resistance, (R)} in Amperes, (A)$ 

By knowing any two values of the Voltage, Current or Resistance quantities we can use **Ohms Law** to find the third missing value. **Ohms Law** is used extensively in electronics formulas and calculations so it is "very important to understand and accurately remember these formulas".

To find the Voltage, (V)

 $[V = I \times R]$  V (volts) = I (amps) x R ( $\Omega$ )

To find the Current, (1)

 $[I = V \div R]$   $I (amps) = V (volts) \div R (\Omega)$ 

To find the Resistance, (R)

 $[R = V \div I]$  R  $(\Omega) = V$  (volts)  $\div I$  (amps)

# Ac and DC -



Figure 3.8.1 (A) Electrical Signals

- There are two types of electrical signals , those being alternating current (AC), and direct current (DC).
- With alternating current, the direction electricity flows throughout the circuit is constantly reversing. You may even say that it is alternating direction. The rate of reversal is measured in Hertz, which is the number of reversals per second. So, when they say that the US power supply is 60 Hz, what they mean is that it is reversing 120 times per second (twice per cycle).
- With Direct Current, electricity flows in one direction between power and ground. In this arrangement there is always a positive source of voltage and ground (OV) source of voltage. You can test this by reading a battery with a multimeter.
- Speaking of voltage, electricity is typically defined as having a voltage and a current rating. Voltage is obviously rated in Volts and current is rated in Amps. For instance, a brand new 9V battery would have a voltage of 9V and a current of around 500mA (500 milliamps).
- Electricity can also be defined in terms of resistance and watts. We will talk a little bit about resistance in the next step, but I am not going to be going over Watts in depth. As you delve deeper into electronics you will encounter components with Watt ratings. It is important to never exceed the Wattage rating of a component, but fortunately that Wattage of your DC power supply can easily be calculated by multiplying the voltage and current of your power source.

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Figure 3.8.1 (B) 2 Parallel Wiring



Figure 3.8.1 (C) 3 Parallel motor & Series Wiring

- > There are two different ways in which you can wire things together called series and parallel.
- ➢ When things are wired in series, things are wired one after another, such that electricity has to pass through one thing, then the next thing, then the next, and so on.
- ➤ In the first example, the motor, switch and battery are all wired in series because the only path for electricity to flow is from one, to the next, and to the next.
- > When things are wired in parallel, they are wired side by side, such that electricity passes through all of them at the same time, from one common point to another common point
- > In the next example, the motors are wired in parallel because the electricity passes through both motors from one common point to another common point.
- ➤ In the final example the motors are wired in parallel, but the pair of parallel motors, switch and batteries are all wired in series. So, the current is split between the motors in a parallel fashion, but still must pass in series from one part of the circuit to the next.

**3.8.2** Explain basic knowledge of components such as diode, transformer, LED, photo transistor, capacitor, thermistor ICs etc.

**Basic electronics components Basic Components** 



Figure 3.8.2 (A) Basic components

In order to build circuits, you will need to become familiar with a few basic components. These components may seem simple, but are the bread and butter of most electronics projects. Thus, by learning about these few basic parts, you will be able to go a long way.

# **Resistors**



\_///\_<sup>47К</sup>

Figure 3.8.2 (B) Resistors

- As the name implies, resistors add resistance to the circuit and reduces the flow of electrical current. It is represented in a circuit diagram as a pointy squiggle with a value next to it.
- The different markings on the resistor represent different values of resistance. These values are measured in ohms.
- Resistors also come with different wattage ratings. For most low-voltage DC circuits, 1/4 watt resistors should be suitable.
- Values are read from left to right towards the (typically) gold band. The first two colors represent the resistor value, the third represents the multiplier, and the fourth (the gold band) represents the tolerance or precision of the component. You can tell the value of each color by looking at a resistor color value chart.
- > Anyhow... a resistor with the markings brown, black, orange, gold will translate as follows: 1 (brown) 0 (black) x 1,000 = 10,000 with a tolerance of +/-5%
- Any resistor of over 1000 ohms is typically shorted using the letter K. For instance, 1,000 would be 1K; 3,900, would translate to 3.9K; and 470,000 ohms would become 470K.
- Values of ohms over a million are represented using the letter M. In this case, 1,000,000 ohms would become 1M.

# **Capacitors**



Figure 3.8.2 (C) Capacitors

- > A capacitor is a component that stores electricity and then discharges it into the circuit when there is a drop in electricity.
- Capacitors are measured in Farads. The values that you will typically encounter in most capacitors are measured in picofarad (pF), nanofarad (nF), and microfarad (uF).
- The most commonly encountered types of capacitors are ceramic disc capacitors that look like tiny M&Ms with two wires sticking out of them and electrolytic capacitors that look more like small cylindrical tubes with two wires coming out the bottom (or sometimes each end).
- Electrolytic capacitors are typically polarized. This means that one leg needs to be connected to the ground side of the circuit and the other leg must be connected to power. If it is connected backwards, it won't work correctly.
- Electrolytic capacitors have the value written on them, typically represented in uF. They also mark the leg which connects to ground with a minus symbol (-). This capacitor is represented in a schematic as a side-by-side straight and curved line. The straight line represents the end which connects to power and the curve connected to ground.

# **Diodes**



Figure 3.8.2 (D) Diodes

- Diodes are components which are polarized. They only allow electrical current to pass through them in one direction. This is useful in that it can be placed in a circuit to prevent electricity from flowing in the wrong direction.
- Another thing to keep in mind is that it requires energy to pass through a diode and this results in a drop of voltage. This is typically a loss of about 0.7V. This is important to keep in mind for later when we talk about a special form of diodes called LEDs.
- The ring found on one end of the diode indicates the side of the diode which connects to ground. This is the cathode. It then follows that the other side connects to power. This side is the anode.

# **Transistors**



Figure 3.8.2 (E) Transistors

- A transistor takes in a small electrical current at its base pin and amplifies it such that a much larger current can pass between its collector and emitter pins.
- > The amount of current that passes between these two pins is proportional to the voltage being applied at the base pin.
- > There are two basic types of transistors, which are NPN and PNP. These transistors have opposite polarity between collector and emitter.
- NPN transistors allow electricity to pass from the collector pin to the emitter pin. They are represented in a schematic with a line for a base, a diagonal line connecting to the base, and a diagonal arrow pointing away from the base.
- PNP transistors allow electricity to pass from the emitter pin to the collector pin. They are represented in a schematic with a line for a base, a diagonal line connecting to the base, and a diagonal arrow pointing towards the base.



Figure 3.8.2 (F) Integrated circuit

- > An integrated circuit is an entire specialized circuit that has been miniaturized and fit onto one small chip with each leg of the chip connecting to a point within the circuit.
- > These miniaturized circuits typically consist of components such as transistors, resistors, and diodes.



Figure 3.8.2 (G) Potentiometers

> Potentiometers are variable resistors. In plain English, they have some sort of knob or slider that you turn or push to change resistance in a circuit.

# 

- LED stands for light emitting diode. It is basically a special type of diode that lights up when electricity passes through it.
- Like all diodes, the LED is polarized and electricity is only intended to pass through in one direction.



- > A switch is basically a mechanical device that creates a break in a circuit.
- When you activate the switch, it opens or closes the circuit. This is dependent on the type of switch it is.
- > Normally open (N.O.) switches close the circuit when activated.
- > Normally closed (N.C.) switches open the circuit when activated.
- As switches get more complex they can both open one connection and close another when activated. This type of switch is a single-pole double-throw switch (SPDT).

**Batteries** 





Figure 3.8.2 (J) Battery

- > A battery is a container which converts chemical energy into electricity.
- By placing batteries in series you are adding the voltage of each consecutive battery, but the current stays the same. For instance, a AA-battery is 1.5V. If you put 3 in series, it would add up to 4.5V. If you were to add a fourth in series, it would then become 6V.
- By placing batteries in parallel the voltage remains the same, but the amount of current available doubles. This is done much less frequently than placing batteries in series, and is usually only necessary when the circuit requires more current than a single series of batteries can offer.

# Wire



Figure 3.8.2 (K) Wires

- Wires are nice because they allow you to connect things without adding virtually no resistance to the circuit.
- This allows you to be flexible as to where you place parts because you can connect them together later with wire.
- > It also allows you to connect a part to multiple other parts.

## Inductors

These are passive components that store energy in the form of a magnetic field. An inductor simply consists of a coil of wire wound around some kind of core. The core could be a magnet or air. When current passes through the inductor, a magnetic field is created around it. The magnetic field is stronger if a magnet is used as the core.

# Transformers

Built with two coils of wire, transformers are commonly used to step up or step down power

# **Unit 3.9 Repair & Replacement**

# Unit Objectives 🎯

By the end of this unit, participants will be able to

- Explain how to rectify so as to avoid repeat fault in the refrigerator.
- Describe the process of selection of appropriate spares for replacement.

# **3.9.1 Explain how to rectify so as to** avoid repeat fault in the refrigerator

Before calling for service, review the checkpoints below. Any service calls regarding normal situations (No Defect Cases) will be charged to users.

# **Temperature**

Symptom	Possible causes	Solution
Fridge/freezer does not operate. Fridge/freezer temperature is warm.	<ul> <li>Power cord is not plugged in properly.</li> </ul>	• Properly plug in the powercord.
	<ul> <li>Temperature control is not set correctly.</li> </ul>	• Set the temperature lower.
	<ul> <li>Refrigerator is located neara heat source or direct sunlight.</li> </ul>	<ul> <li>Keep the refrigerator away from direct sunlight or a heat source.</li> </ul>
	<ul> <li>Not enough clearance between refrigerator and nearby walls or cabinets.</li> </ul>	<ul> <li>We recommend that the gap between the refrigerator and nearby walls (or cabinets) is more than</li> <li>50 mm.</li> </ul>
	<ul> <li>The refrigerator is overloaded.</li> <li>Food is blocking the refrigerator vents.</li> </ul>	<ul> <li>Do not overload the refrigerator. Do not allow food to block vents.</li> </ul>
Fridge/freezer is over-cooling.	Temperature control is not set     correctly.	• Set the temperature higher.
		<ul> <li>To prevent condensation from forming, the refrigerator has heat-proof piping in the front corners. If the ambient temperature rises, this equipment may not work effectively. This is not a system failure.</li> </ul>
Interior wall is hot.	<ul> <li>Refrigerator has heat-proof piping in the interior wall.</li> </ul>	

Odour		
Symptom	Possible causes	Solution
Refrigerator has odours.	Spoiled food.	<ul> <li>Clean the refrigerator and remove any spoiled food.</li> </ul>
	• Food with strong odours.	<ul> <li>Make sure strong smelling food is wrapped airtight.</li> </ul>
Frost		
Symptom	Possible causes	Solution
Frost around the vents.	• Food is blocking the vents.	<ul> <li>Make sure no food blocks the refrigerator vents.</li> </ul>
Frost on interior walls.	• Door is not closed properly.	• Make sure food does notblock the door. Clean thedoor gasket.
Condensation		
Symptom	Possible causes	Solution
Condensation forms on the interior walls.	If door is left open, moisture enters the refrigerator.	Remove the moisture and do     not leave a door open for     extended periods of time.
	<ul> <li>Food with high moisture content.</li> </ul>	<ul> <li>Make sure food is wrapped airtight.</li> </ul>
# **3.9.2** Describe the process of selection of appropriate spares for replacement

#### Water Inlet Valve

#### Problem: Fridge Not Producing Ice Properly

The ice maker is powered by pressurized water that filters through the machine via the inlet valve. Unfortunately, your ice maker won't get enough water to create cubes if this refrigerator replacement part doesn't have the right water pressure to open it. To work effectively, the water inlet valve requires at least 20 psi.

#### Water Filter

#### Problem: Water Tastes Bad or Ice Dispenser Doesn't Work

The most simple and common refrigerator repair part is the water filter. If your water filter is clogged or dirty, you'll have bad-tasting water or limited ice. These filters should be replaced every six months to ensure quality water.

#### **Evaporator Fan**

#### Problem: Freezer is Fine, Fridge is Warm

If you notice that your freezer is working properly but your refrigerator is too warm, most likely the evaporator fan motor is faulty. As we discussed previously, if you find your fridge is too loud, this fan could also be the issue. You can test this fan with a multimeter. If it shows that it isn't working with continuity, then it needs to be replaced.

#### **Condenser Fan Motor**

#### Problem: Fridge Not Cooling Properly

Some models of fridges use a fan to help the condenser coils to distribute heat thoroughly throughout the appliance. This refrigerator part can easily become overheated and not work properly causing a warm fridge.

#### Thermistor

#### Problem: Loud Noises or Fridge Not Cooling

This fridge part is in charge of monitoring your appliance's internal temperature. If the thermistor is defective, the control board won't receive the correct internal temperatures of your fridge.

# **Unit 3.10 Refrigerator Models & Prices**

# ₋ Unit Objectives 🎯

By the end of this unit, participants will be able to

- Explain components/modules of refrigerators and their prices.
- Describe packaging waste disposal procedures.

# -3.10.1 Explain components/modules of refrigerators and their prices -

#### Best Refrigerator Brands in India

We have listed each brand with its bestselling model including its pricing, special features, technology, pros, and cons. Please note that the brands have been categorized as per the price of their bestselling models and not as the top-ranking brands on a scale of 0 to 10.

1. Haier 258 L 3-star Inverter Frost-Free Double Door Refrigerator (HEF-25TDS, Dazzle Steel, Convertible)

Haier is a leading smart-appliance brand specializing in highly efficient refrigerators. The brand manufactures fridges with remarkable build quality, impeccable designs, and most importantly, great functionality.

The Haier 258 L double-door refrigerator is 3-stars rated and features a sleek and stylish design. double-door refrigerator. Economical and functional, this refrigerator is backed by twin inverter technology that ensures the compressor and the fan motor both run uniformly without any fluctuations at DC thus providing consistent cooling. Moreover, the twin inverter technology is energy efficient and cuts back on your electricity bills.

The refrigerator is a 5-in-1 convertible that allows you to store your food and cater to all your refrigerator needs accordingly. Also, the multi airflow keeps your food fresh for a little longer and provides you with more space than before. Its thicker PUF helps in retaining low temperatures for better cooling. With this refrigerator you need not worry about power fluctuations as it can work on a power supply as low as 135V, hence providing you with a stabilizer-free operation.

- **Price**: ₹ 22,899
- Colour: Dazzle Steel
- Energy Efficiency: 3-star
- Annual Energy Consumption: 182 Kilowatt hours
- Capacity: 258 litres

- Fresh Food Capacity: 190 litres
- Freezer Capacity: 68 litres
- Installation Type: Free-Standing
- Material: Steel
- Defrost System: Frost free
- Weight: 53 kg
- Warranty: 10 Years warranty on Compressor & fan motor, 1-year warranty on the product

Pros	Cons
Economical; Stylish	Not suitable for large families
Consumes less energy	Small storage capacity as compared to other products on this list
Twin inverter technology	
Turbo icing technology	

#### 2. Lloyd 310 L 2 Star Inverter Frost Free Double Door Refrigerator

Lloyd is a well-known brand that almost every Indian has owned at one time or another. The company, which specialises in electrical appliances, is recognised for producing highquality refrigerators with useful features and, most importantly, at affordable prices.

The Lloyd 310 L 2 Star Inverter Frost Free Double Door Refrigerator has smart inverter technology, which uses a variable-speed compressor to adapt the cooling according to the refrigerator's demands. As a consequence, it saves energy and lasts a long time.

The fridge also has advanced features including automatic defrost cycles with adaptive patterns that optimise cooling and energy efficiency. It incorporates shelves with built-in air vents to provide consistent cooling in each compartment, as well as exclusive cool shower technology.

Furthermore, owing to the refrigerator's six different modes, the freezer may be used in a number of ways depending on the load and items placed in it. As a consequence, uniform cooling in the freezer and refrigerator is achieved, guaranteeing that the food stays fresh. Last but not least, the refrigerator has a large vegetable tray with a 27-litre storage capacity.

- **Price**: ₹ 23,490
- Colour: Black
- Energy Efficiency: 2-star
- Annual Energy Consumption: 200 Kilowatt-hours
- Capacity: 310 litres
- Fresh Food Capacity: 235 litres
- Freezer Capacity: 75 litres
- Installation Type: Free-Standing
- Material: Steel
- Defrost System: Frost free
- Weight: 57 kg
- Warranty: 1 Year on Product, 10 Years on Compressor

Pros	Cons
The product features a convertible freezer technology with 6 in 1 mode	The product creates a little noise while running
Intelligent inverter technology allows a smooth operation	The storage capacity of the refrigerator is very less
Patented cool shower technology that keeps the content fresh	
Large vegetable tray with 27 litres of storage space	

#### 3. LG 260L 3 Star Smart Inverter Frost-Free Double Door Refrigerator

LG is one of the most popular refrigerator brands in India. This LG double door fridge has a capacity of 260 litres and features a smart inverter compressor. The smart inverter compressor is energy efficient and provides less noise. Additionally, it is more durable than other compressors. The trimless tempered glass shelves give it a sleek look and make it easy to clean. The fridge also features door cooling+, express freeze, and smart connect. The chiller zone is perfect for storing beverages and the deodorizer keeps the fridge smelling fresh. The LG double-door fridge is a great option for small families or bachelors.

#### Features :

- Auto defrost function to prevent ice-build up
- Capacity 260 L: Suitable for small families and bachelor
- I freezer capacity: 75L, fresh food capacity: 185L
- Energy Rating: 3 Star
- Warranty: 1 year on product,10 years on compressor
- Smart inverter compressor energy efficient, less noise & more durable
- Shelf Type: Trimless tempered Glass no. of Shelves: 03 TOP LED: Energy Efficient & Longer Life Span
- Also included in the box: Unit of Refrigerator and unit user manual
- Special Features: Door Cooling+, Temp. Control: Display I Micom, Express Freeze, Works without Stabilizer (100-310V), Smart Diagnosis, Smart Connect, Jet Ice, Chiller Zone
- Deodorizer: Catechin, Multi Air Flow, Anti-Bacterial gasket, Moist 'N' Fresh, Humidity Controller, Vegetable box with 29. L capacity.

Pros	Cons
Efficient and durable compressor	No cons as such!
Trimless tempered glass shelves for a sleek look	
Door cooling+ feature keeps the fridge cool	
Deodorizer keeps the fridge smelling fresh	
Sleek design	
Express freeze	
Easy to clean	
Less noise	
Chiller zone is perfect storing for beverages	

# 4. Whirlpool 265 L 3-star Inverter Frost-Free Double Door Refrigerator (INTELLIFRESH INV CNV 278 3S, German Steel, Convertible)

Whirlpool is another leading brand that has been owned in every Indian household at least once. Their refrigerators are perfect blends of design, reasonable pricing, and usefulness. The brand is known for its excellent customer service and high warranty periods.

The Whirlpool 265 L 3-stars rated refrigerator features a modish design and comes with adaptive intelligence that analyzes data continuously to ensure proper cooling for a long time. Also, the advanced IntelliSense inverter technology adapts the cooling according to the internal load with less energy consumption giving you a matchless performance.

Furthermore, you can get up to 15 days of garden freshness with its Advanced Zeolite technology. The refrigerator has a vegetable crisper with honeycomb moisture lock-in technology that condenses the evaporated moisture to provide freshness and uniform air. Lastly, the freshener also helps in reducing oxidation and maintaining the freshness of fruits and vegetables.

- **Price**: ₹ 25,990
- Colour: Grey
- Energy Efficiency: 3-star
- Annual Energy Consumption: 190 Kilowatt hours
- Capacity: 265 litres
- Fresh Food Capacity: 184 litres
- Freezer Capacity: 75 litres
- Installation Type: Free-Standing
- Material: Steel
- Defrost System: Frost free
- Weight: 56 kg
- Warranty: 1 Year on Product, 10 Years on Compressor

Pros	Cons
3-star rated	Not a truly convertible refrigerator
Adaptive intelligence; High capacity	Неаvy
Intellisense inverter technology	
Honeycomb moisture lock-in technology	

#### 5. Samsung 253L 3 Star Inverter Frost Free Double Door Refrigerator

The Samsung 253L Inverter Frost Free Double Door Refrigerator is one of the best refrigerators in India. It has a capacity of 253L and is suitable for families with two to three members or bachelors. The refrigerator comes with a digital inverter compressor which makes it more energy efficient and also has a ten-year warranty on the compressor. The fridge also features a convertible three-in-one up to 88L extra storage option which makes it more versatile. Other features include a voltage range of 100V-300V, stabilizer free operation, digital display, fresh room, and deodorizer.

#### Features :

- Capacity 253 litres
- Suitable for families with two to three members or bachelor
- Energy rating: 3 Star
- Digital inverter compressor
- Ten year warranty on compressor, 1 year on product
- Convertible three-in-one up to 88L extra storage option
- Voltage range of 100V-300V
- Stabilizer free operation
- Digital display
- Fresh room
- Deodorizer

Pros	Cons
Energy efficient	None
More storage options	
Stabilizer free operation	
Has a digital display	
Long warranty on compressor	

#### 6. Bosch 559 L 2 Star Inverter Frost Free Double Door Refrigerator

Another famous refrigerator brand in India is Bosch, which is known for its classic design and high functionality. The firm takes pride in offering exceptional customer service as well as developing high-quality home appliances.

One of the most elegant and modern-looking double-door refrigerators on our list is the Bosch 559 L 2 Star Refrigerator. This refrigerator, with a capacity of 559 litres, is ideal for a household of six to eight. Rapid cooling technology ensures consistent cooling by blasting cool air at every shelf level. Furthermore, the refrigerator's electric fans evenly disperse cool air throughout the freezer, preventing ice from forming.

The R600A refrigerant, which comprises cold gases that travel from one point to another to release heat outdoors, is also used in the Bosch frost-free refrigerator. Finally, it has a humidity controller vegetable box that helps moderate the airflow inside the box, ensuring that the food stays fresh and clean.

- **Price**: ₹ 71,799
- Colour: Black
- Energy Efficiency: 2-star
- Capacity: 559 litres
- Installation Type: Free-Standing
- Material: Steel
- Defrost System: Automatic
- Weight: 68 kg
- Warranty: 1 Year on Product, 10 Years on Compressor

Pros	Cons
The product is highly spacious and features a classic design	The product creates a little noise while running
The quick cooling technology and automatic defrosting makes it stand out from the competitors	A very heavy-weighted product that is difficult to move around
Nature-friendly refrigerant is used in this product	
There is a humidity controller vegetable box	

#### 7. Godrej 236 L 2 Star Inverter Frost-Free Double Door Refrigerator

The Best Refrigerator Brand in India according to us is Godrej. Some of the unique selling points for this brand are, A auto defrost function to prevent ice-build up. The Capacity of 236 litres is suitable for families with two to three members. An energy rating of two stars and annual energy consumption of 243 Kilowatt hours. A manufacturer warranty of one year for the product and ten years for the compressor. An inverter compressor is energy efficient, has silent operation and is more durable. Toughened glass shelves are included as well as a jumbo vegetable tray, anti-bacterial gasket, widest shelves and large freezer space.

#### Features :

- Capacity 236 litres
- Energy rating: two stars
- Annual energy consumption: 243 Kilowatt hours
- Manufacturer warranty: one year for the product; ten years for the compressor
- Inverter Compressor Energy efficient, silent operation & more durable
- Shelf type: toughened glass shelves
- Included in the box: Refrigerator, User Manual, Warranty Card
- Special Features: Jumbo vegetable tray, Anti-Bacterial gasket, Toughened Ten years for the compressor.

Pros	Cons
Energy efficient	May be too big for some families
Less noise and more durable	
Jumbo vegetable tray	
Anti-Bacterial gasket	
Toughened glass shelves	
Widest shelves	
Large freezer space	
Affordable price	

#### 8. CROMA 170 L 2 Star 2020 Direct Cool Single Door Refrigerator

Despite its reputation for high-quality culinary goods, Croma is a reliable brand for home equipment, particularly refrigerators. Despite the fact that Croma refrigerators are somewhat more expensive than their competitors, you can be confident that you're making a prudent one-time investment!

The Croma 170 L frost-free refrigerator boasts a traditional design and an energy-efficient VarioInverter compressor that varies compressor speed dependent on the refrigerator's current interior and outside conditions.

An interior temperature sensor, a defrost system, a door sensor, an ambient sensor, and a voltage sensor are among the six energy-saving smart sensors included. In addition, the refrigerator contains an LED light illuminator that lasts longer than ordinary light bulbs.

PUF insulation is also used in this refrigerator, which assists in the effective preservation of low temperatures for better cooling. In addition, the refrigerator has the unique ability to prevent temperature variations by delivering efficient and regular air circulation across all compartments.

- **Price**: ₹ 11,990
- Colour: Metallic
- Energy Efficiency: 2-star
- Annual Energy Consumption: 200 Kilowatt-hours
- Capacity: 170 litres
- Fresh Food Capacity: 150 litres
- Freezer Capacity: 20 litres
- Installation Type: Free-Standing
- Material: Stainless-Steel
- Defrost System: Frost free
- Weight: 35.7 kg
- Warranty: 1 Year on Product, 10 Years on Compressor

Pros	Cons
The refrigerator consumes comparatively less energy	The after-sales service of the product is not very satisfactory
It has a classic design and is highly spacious	The product is very heavy to move around
The fridge remains cool for 16 hours	The product has only a 2-star rating
There are intelligent sensors for increased efficiency	

# 9. Samsung 415L 3-star Inverter Frost Free Double Door Refrigerator (RT42M553ES8/TL, Elegant Inox, Convertible)

Samsung is one of the leading manufacturers of electrical appliances and no doubt, their refrigerators are also the best. The brand provides a high warranty, exceptional customer support, intriguing designs, and functional features. Samsung has a wide range of refrigerators developed with the latest technology in a range of sizes and designs.

The Samsung 415 L 3-star frost-free double door refrigerator is an Amazon bestseller that is available in two size options viz. 394 L and 415 L. The refrigerator is backed by digital inverter technology that allows precise cooling and keeps the food fresh for a long time. The freshest zone is a smart design drawer that caters to the need of storing perishable food.

This 5-in-1 convertible refrigerator is powered by twin cooling plus technology that takes care of your everyday needs and gives you 2 times longer freshness. Moreover, the power freeze option at the touch of a button allows it to make ice 31% faster than other refrigerators. Also, there is a door alarm that rings whenever the door is not locked properly.

- **Price**: ₹ 43,990
- Colour: Elegant Inox
- Energy Efficiency: 3-star
- Annual Energy Consumption: 258 Kilowatt hours
- Capacity: 415 litres
- Fresh Food Capacity: 295 litres
- Freezer Capacity: 89 litres
- Installation Type: Free-Standing
- Material: Steel
- Defrost System: Frost Free
- Weight: 71.6 kg
- Warranty: 1 Year on Product, 10 Years on Compressor

Pros	Cons
Twin cooling plus technology; Safety against power fluctuations	Heavy
Stabilizer free operation; Smart Connect inverter	Expensive
Toughened glass shelves; Big bottle guard	
Energy-saving alarm; Movable ice maker	

#### 10. AmazonBasics 564 L Side-by-Side Door Refrigerator (Silver Steel Finish) -

Although some people are sceptical about AmazonBasics due to its low pricing, the brand is worth considering due to its classic design and interesting features. The warranty offered by AmazonBasics is low as compared to the other established brands but its customer service is highly satisfactory. Most importantly, the brand launches highly functional and economical products with a long life.

The Amazon Basic 564 L side-by-side frost-free refrigerator is the only variant of its kind on this list. A perfect choice for a large-sized family with no budget constraints and plenty of space, this refrigerator is sure to enhance the interiors of any kitchen. Available in three size options viz. 468 L, 564 L and 670 L, you get two colour choices with this classic refrigerator.

It comes with Auto Defrost technology that prevents it from building up extra ice automatically. Highly spacious and stylish, this fridge can meet the everyday requirements of your family members. Its left side is a freezer whereas the right one is a regular fridge. Furthermore, the refrigerator comes with multiple shelves and pull-out drawers for surplus storage and easy access.

The Multi airflow system is responsible for smooth airflow in the storage compartment for uniform cooling. The refrigerator has a unique feature of an LED display panel that helps in controlling the temperature easily. Although expensive, this refrigerator comes with energyefficient technology that reduces consumption, making it lighter on the pocket in the long run.

Also, the quick freeze feature of the refrigerator converts water into ice and the quick cool feature keeps your food fresh and hygienic for a longer period. Moreover, it has a child lock option that prevents accidental settings changes on its control panel. Last but not least, it is also equipped with a door alarm that alerts you in case the door is accidentally left open.

- Price: ₹ 47,499
- Colour: Sapphire Magnolia
- Energy Efficiency: 4 Star
- Capacity: 564 litres
- Installation Type: Free-Standing
- Material: Steel with glass finish
- Defrost System: Automatic
- Weight: 91 kg
- Warranty: 1 Year on Product, 5 Years on Compressor

Pros	Cons
Energy-efficient; High storage capacity	Expensive
Super freeze technology; Economical as compared to other side by side door refrigerators available in the market	Heavy
LED display with touch button; Child lock and alarm	Limited five years warranty on the compressor
Adjustable thermostat feature	

# **3.10.2** Describe packaging waste disposal procedures

An increasingly important environmental concern is the disposal of old refrigerators—initially because freon coolant damages the ozone layer—but as older generation refrigerators wear out, the destruction of CFC-bearing insulation also causes concern. Modern refrigerators usually use a refrigerant called HFC-134a (1,1,1,2-Tetrafluoroethane), which does not deplete the ozone layer, unlike Freon. R-134a is becoming much rarer in Europe. Newer refrigerants are being used instead. The main refrigerant now used is R-600a, or isobutane which has a smaller effect on the atmosphere if released. There have been reports of refrigerators exploding if the refrigerant leaks isobutane in the presence of a spark. If the coolant leaks into the fridge, at times when the door is not being opened (such as overnight) the concentration of coolant in the air within the fridge can build up to form an explosive mixture that can be ignited either by a spark from the thermostat or when the light comes on as the door is opened, resulting in documented cases of serious property damage and injury or even death from the resulting explosion.

Disposal of discarded refrigerators is regulated, often mandating the removal of doors for safety reasons. Children playing hide-and-seek have been asphyxiated while hiding inside discarded refrigerators, particularly older models with latching doors, in a phenomenon called refrigerator death. Since 2 August 1956, under U.S. federal law, refrigerator doors are no longer permitted to latch and they can be opened from the inside. Modern units use a magnetic door gasket that holds the door sealed but allows it to be pushed open from the inside. This gasket was invented, developed and manufactured by Max Baermann (1903–1984) of Bergisch Gladbach/Germany.

Regarding total life-cycle costs, many governments offer incentives to encourage recycling of old refrigerators. One example is the Phoenix refrigerator program launched in Australia. This government incentive picked up old refrigerators, paying their owners for "donating" the refrigerator. The refrigerator was then refurbished, with new door seals, a thorough cleaning and the removal of items, such as the cover that is strapped to the back of many older units. The resulting refrigerators, now over 10% more efficient, were then distributed to low income families.

# **Unit 3.11 Energy Rating & Troubleshooting Knowledge**

# Unit Objectives 🞯

By the end of this unit, participants will be able to

- State refrigerator energy ratings such as BEE rating.
- State troubleshooting knowledge with respect to refrigerators.

# 3.11.1 State refrigerator energy ratings such as BEE rating

Whenever you're shopping for appliances such as refrigerators, air conditioners, or geysers, you might have noticed star rating stickers on the appliances. These are called BEE star labels and they show how much electricity the appliance consumes in a year. Each appliance gets between one and five stars, with five stars meaning that it's extremely efficient and is likely to keep your electricity bills in check.

These star labels are issued by the Bureau of Energy Efficiency (BEE), which is an Indian government agency that falls under the Ministry of Power. BEE star labels have become an important factor for people looking to purchase appliances in India but there is more to these labels than just the star rating. To help you understand what star labels actually mean, we spoke to Abhishek Jain, an IIT-Bombay graduate who runs Bijli Bachao, a website dedicated to helping people buy more energy efficient appliances.

Here's everything you need to know about BEE star labels.

#### How are BEE star ratings calculated?

Jain says that the BEE gets all of its data directly from the manufacturers. Whenever manufacturers in certain product categories such as air conditioners launch a new product, they get it tested in a lab accredited by NABL (National Accreditation Board for Testing and Calibration Laboratories) and send the results to BEE.

Jain says that testing these appliances is not a long process. "It may take just a day to get a model tested in an NABL accredited lab. Lot of values are extrapolated. So for e.g. in case of air conditioners, the power consumption and efficiency are tested at 100 percent and 50 percent capacities. And then the value is extrapolated to running conditions in different seasons," he explains.

Jain adds that these measurements are then extrapolated by calculating heat load in an ideal room (the correct size for a 1.5 ton AC in this example) in every month. "...in the month of March the heat load would be about 60 percent so it would run at 600 watts. Also the assumption is made (based on typical usage) that the AC will be used in about 7-8 hours a day in March and 15-16 hours in May and may be just 1-2 hours in August. And that is how annual electricity consumption is calculated."

The process for determining star ratings differs between various categories. For instance, the BEE had announced in 2016 that it would be switching to ISEER (Indian Seasonal Energy Efficiency Ratio) to calculate star ratings for air conditioners. This is an evolution of the SEER method used in the US. ISEER allows manufacturers to make more efficient air conditioners for the Indian climate conditions.

Jain has a detailed explanation for the BEE's method of assigning efficiency ratings.

"A method of calculation is defined for every category of appliance," he explains. "Efficiency is defined as output by input. The input is power consumption for every appliance, but then output is different."

The output for air conditioners, for example, is cooling capacity; for fans, it's air delivery, and so on.

"So for every appliance a method of calculation is defined. Based on the calculations, the market is analysed for existing products (to get a kind of bell curve distribution of the numbers). The bottom 10 percent has to be eliminated from the market and then rest 90 percent has to be divided into five (different) star ratings. Doing this regularly keeps eliminating the bottom 10 percent and improves the overall market efficiency."

#### Why should you look for BEE star labels when buying appliances?

A higher star rating means more a more efficient appliance, which means a lower electricity bill every month. Most modern households have multiple appliances that consume a lot of electricity such as air conditioners, refrigerators, and even ceiling fans. As Jain puts it, "If the usage of any appliance is high, one must go for a high energy efficient appliance. Air conditioners can consume up to 1.5 units per hour of usage and it can be brought down to as low as 0.5 unit per hour."

"Ceiling fans have a very high usage of 10-20 hours per day and cumulatively all fans can contribute to up to 4-5 units per day in a household. Refrigerator and water heaters again can contribute to up to 3-4 units per day in any house. So looking at efficient appliances for such appliances make a lot of sense."

#### Should you just buy the highest star-rated appliance in each category?

No, this would be a mistake. Star ratings are a good indicator of an appliance's energy efficiency but the system is not without its flaws. Here are a few of the things to watch out for before buying an appliance based on the BEE label:

#### 1. When was the appliance rated?

Each BEE star label also mentions the year in which the appliance was rated. This is perhaps the most important value on the star label. Since the BEE keeps updating the star label system, it's best to buy an appliance that was rated recently. Five-star appliances of today may be downgraded to three stars two years later, so this is something you need to watch out for.

#### 2. Not every category of appliances gets a BEE star label

Jain says BEE star ratings are not mandatory for ceiling fans and manufacturers may reduce the fan's output for a higher rating. If the fan doesn't effectively spread air around the room on a hot summer day, then there's no point of having higher energy efficiency. Similarly, categories such as multi-door refrigerators don't yet have a star ratings system, so the decision becomes difficult.

#### 3. Sub-categories of appliances have different standards

The easiest example for this is air conditioners. Window air conditioners and split air conditioners have different star labels, so a five-star rated window AC may actually be consuming more electricity than a three-star split AC. The BEE label also mentions how many units each appliance consumes per year, which might give you a more accurate idea of the appliance's performance.

#### 4. Calculate ROI

There's also the question of return on investment (ROI). The most energy efficient technologies may be present in a product that's way above your budget, and in such cases you might be better off looking for a product with the highest rating in your budget. This differs a lot from case to case, so you're better off calculating the ROI before buying. An inefficient window AC is likely to cost you a lot more in terms of electricity bills than a highly efficient inverter AC, but not all decisions are that straightforward.

#### 5. Look at the technology used

In some cases, lower efficiency is the price to be paid for better technology. Jain says, "There are certain appliances like TVs, that do have star ratings, but higher electricity consumption is actually attributed to advanced technologies. So in such cases if advanced technology is a priority, then star ratings may not be an effective way to filter out appliances." However, as we mentioned in our AC buying guide, lots of new appliances use the inverter technology to reduce power consumption. In these cases, the appliance may consume less electricity than its non-inverter counterpart.

# 3.11.2 State troubleshooting knowledge with respect to refrigerators -

# The refrigerator is leaking water

Are you regularly slipping on a mysteriously appearing puddle of water next to your refrigerator? Here are the two most common reasons for a refrigerator leaking water and how to resolve them:

#### Clogged defrost drain

This is the most common reason behind a leaking refrigerator. Basically, what happens is that nasty debris and food bits get stuck in the drain hose, which leads to a clog. Over time, ice starts to build up and you end up with a huge water puddle.

**How to fix it:** The first thing that you can do is to clear up the drain from the inside of the fridge, using only hot water. If this doesn't work, get a pipe cleaner and try to push out the nasty buildup. As a last resort, you can also try to manually remove the debris by pulling the appliance out and cleaning the rubber check valve located on the back service panel. Remove the debris with soap and warm water and install the valve back.

#### Clogged/frozen water supply

A clogged or frozen water supply can also be the reason for a leaking fridge. Again, this is a very common refrigerator problem and you don't have much control over it in terms of prevention.

#### How to fix it:

First, you have to unplug the appliance from the power socket. Then, you need to find the shutoff valve – it will be most likely installed underneath your kitchen sink. Make sure that the valve is completely closed and inspect the plastic supply line for clogs or leaks. In case of a tear, you'll have to replace the water supply line. If everything seems OK, but you are still experiencing leaking, you are dealing with an ice blocage. In this scenario, what you need to do is leave the refrigerator unplugged so the ice can melt.

#### The refrigerator is not cooling

If you notice that your fridge doesn't seem cool enough and that your food is spoiling.

#### Lack of power supply

We don't need to explain this one – you tripped on the refrigerator's power supply cord and unplugged it from the electrical socket. The end result is warm low-fat strawberry yoghurt.

How to fix it: Just plug-in back the appliance to the socket – duh.

#### Changed temperature setting

Check your temperature control thermostat. Maybe you've bumped it accidentally while reaching for something, or someone decided that warm soda is a nice thing.

How to fix it: Set the thermostat to the right temperature setting.

#### Blocked condenser fan

If you have a refrigerator model with a condenser fan, there is a chance that something is blocking the part like dust, nasty buildup, pet hair etc. An issue like this will affect both the refrigerator and freezer.

**How to fix it:** Unplug the refrigerator from the power supply and pull it out. Locate the condenser fan. Clean the element with a brush or kitchen towel and spin it to see if it's moving. If everything seems OK, plug the refrigerator back in and check if the fan is working properly. In case the part has decided to give up on you, you'll have to contact a professional to replace it.

#### The freezer is not cooling

Two words: gloopy ice cream. Here is why your freezer is not cooling your favourite dessert:

#### Defrost system problems

The purpose of an automatic defrost system is to frost off the evaporator coils every 8 hours and to keep the evaporator's air paths clear. When this part breaks, ice starts to form around the evaporator and back freezer compartment wall, resulting in your freezer not cooling properly.

How to fix it: Fixing a faulty refrigerator system is not an easy task. Your best bet is to call a technician to fix it for you.

#### Broken temperature sensor

A temperature sensor, also called a thermistor, is used to detect the temperature in the air inside your refrigerator. If this part becomes faulty, your appliance will have trouble maintaining the right temperature in both the fridge and freezer, not cooling evenly inside, and defrosting.

How to fix it: The only solution is to get the part replaced.

#### Evaporator fan not running

If you've heard your refrigerator make weird chirping and squeaking sounds prior to your freezer stopping to work, then "congratulations" – you are dealing with either an ice-clogged or broken evaporator fan.

**How to fix it:** All you have to do is take out all of the food from the fridge, unplug the appliance, and wait for it to completely defrost. If you are experiencing the same issues after defrosting your fringe, the evaporator is most likely damaged and in need of a replacement.

#### There is ice buildup and frost on the food

There is nothing like finding half of your food deeply frozen in the refrigerator. That said, there is only one culprit behind this issue and it happens to be:

#### A faulty thermostat control

The temperature control thermostat controls the compressor and evaporator fan motor of the appliance. When the element isn't working correctly, the refrigerator runs longer than required, which results in a frozen shelf of food.

**How to fix it:** Locate the temperature control thermostat and start rotating it. If you hear a click, it means that the part is working. If you don't, get a multi-meter and test the thermostat for continuity on different temperature settings. In a situation in which the part doesn't show any signs of continuity, it will need to be replaced.

#### The ice maker isn't working

That said, here are the three most likely reasons behind a faulty ice maker:

#### **Blocked waterline**

This type of blockage is most commonly caused by stuck ice. Another reason can be a kinked waterline. Nevertheless, both issues are easily resolved.

**How to fix it:** First thing's first – stop the water supply by turning the shut-off valve. To melt the accumulated ice, you'll need to turn off the refrigerator's power for at least two hours. If you want to speed up the melting process, you can use a blow dryer or apply hot water – whatever you find most convenient.

#### Badly positioned shut-off arm

Most fridge models have a shut-off arm installed to prevent the ice bucket from overflowing. Sometimes this part gets stuck in the off position and your ice maker stops working.

**How to fix it:** Locate the shut-off arm and try to reposition it. If the part is frozen, unmount the ice storage bin and remove the frost. You can do this manually or by melting the ice with some hot water. Keep a towel handy to soak up the excess water.

#### Tripped ice bucket sensor

Modern refrigerators have a special sensor that detects the ice bucket. As time passes, ice can build up between the bin and the appliance's wall, pushing the bucket out of its place, which trips the above-mentioned sensor. When this happens, your refrigerator indicates that the bin is missing and stops producing ice.

**How to fix it:** Again, the solution to this problem involves a lot of melting and soaking up excess water. First, take out the ice bin and let it defrost for a few hours. You can speed up the process by giving it a hot bath. Then, make sure to remove all of the accumulated ice from the sensor. It's best to do this manually. Finally, soak up any excess moisture with a clean towel and place the bin back inside.

#### Loud noises and continuous running

A noisy refrigerator, just like a noisy boiler, is not a good thing.. Not only do you have to constantly listen to an annoying buzzing sound, but you'll also get a fatter energy bill at the end of the month. With that in mind, there are two reasons for this type of issue:

#### Dirty condenser coils

Over time, dust and dirt particles start to gather inside the condenser coils of the refrigerator, forcing it to "work harder" to keep a specific temperature. Dirty condenser coils can also lead to a malfunctioning freezer.

**How to fix it:** Start with unplugging the appliance from the power supply. Find the condenser coils -usually, they are located on the bottom of the refrigerator. Remove the grill that's protecting the coils by opening the snaps. Once you have access to the parts, remove the accumulated buildup with the help of a vacuum cleaner or a brush. Once all of the dirt is gone, snap-on back the grill. **Low-temperature setting** 

If you set the refrigerator on a lower temperature, the appliance will, again, start working harder, which will result in a lot of noise, higher bills, freezing, and spoiled food.

**How to fix it:** Easy – just fix the temperature. We recommend setting the appliance to 3-5 °C and waiting for a few hours to see if the refrigerator is working normally again. If you are still experiencing issues, it's best to call a professional technician to check the appliance.

Note

- ALWAYS turn off the appliance before doing any maintenance work.
- If you are planning to defrost your refrigerator, make sure to lay a couple of towels underneath it to absorb excess moisture.
- If you need a part replaced, your best bet is to get a professional to do it instead.

# **3.11.3** Explain various hazards, their causes and prevention/personal safety –

- **1.** Avoid water at all times when working with electricity. Never touch or try repairing any electrical equipment or circuits with wet hands. It increases the conductivity of electric current.
- 2. Never use equipment with frayed cords, damaged insulation or broken plugs.
- **3.** If you are working on any receptacle at your home then always turn off the mains. It is also a good idea to put up a sign on the service panel so that nobody turns the main switch ON by accident.
- 4. Always use insulated tools while working.
- **5.** Electrical hazards include exposed energized parts and unguarded electrical equipment which may become energized unexpectedly. Such equipment always carries warning signs like "Shock Risk". Always be observant of such signs and follow the safety rules established by the electrical code followed by the country you're in.
- **6.** Always use appropriate insulated rubber gloves and goggles while working on any branch circuit or any other electrical circuit.
- **7.** Never use an aluminium or steel ladder if you are working on any receptacle at height in your home. An electrical surge will ground you and the whole electric current will pass through your body. Use a bamboo, wooden or a fibreglass ladder instead.

# **Unit 3.12 Other Home Appliance**

# Unit Objectives 🞯

By the end of this unit, participants will be able to

• Describe other products of the company

## -3.12.1 Describe other Home Appliance products of the company -

A kitchen stove, often called simply a stove or a cooker, is a kitchen appliance designed for the purpose of cooking food. Kitchen stoves rely on the application of direct heat for the cooking process and may also contain an oven, used for baking. "Cookstoves" (also called "cooking stoves" or "wood stoves") are heated by burning wood or charcoal; "gas stoves" are heated by gas; and "electric stoves" by electricity. A stove with a built-in cooktop is also called a range

#### Electric stove

Once electric power was widely and economically available, electric stoves became a popular alternative to fuel-burning appliances. One of the earliest such devices was patented by Canadian inventor Thomas Ahearn in 1892. Ahearn and Warren Y. Soper were owners of Ottawa's Chaudiere Electric Light and Power Company. The electric stove was showcased at the Chicago World's Fair in 1893, where an electrified model kitchen was shown.

Unlike the gas stove, the electrical stove was slow to catch on, partly due to the unfamiliar technology, and the need for cities and towns to be electrified. Early electric stoves were unsatisfactory due to the cost of electricity (compared with wood, coal, or city gas), limited power available from the electrical supply company, poor temperature regulation, and short life of heating elements. The invention of nichrome alloy for resistance wires improved the cost and durability of heating elements.

The first practical design was patented by the Australian David Curle Smith in 1905. His device adopted (following the design of gas stoves) what later became the configuration for most electric stoves: an oven surmounted by a hotplate with a grill tray between them. Curle Smith's stove did not have a thermostat; heat was controlled by the number of the appliance's nine elements that were switched on.

The first electric stoves used heating elements made of high-resistance metal to produce heat. The stovetop (range) surface had one or more circular heating elements, insulated with compressed magnesia and sheathed in a spiral metal tube. Heating elements for the oven are of similar construction but an elongated loop to distribute heat. Elements were made as plug-in consumer-replaceable parts and could also be easily removed for cleaning. Temperature of cooking elements was regulated by adjusting a bimetal thermostat control switch, which switched power on and off to control the average heating effect of the elements.

#### Cooktop

A cooktop or hob is a cooking appliance that heats the bottoms of pans or pots; it does not have an enclosed oven as used for baking or roasting. Cooktops may be heated by gas or electricity and may also have exhaust systems.

Flattop grills are also being installed into kitchen counters and islands, which do double-duty as a direct cooking surface as well as a platform for heating pots and pans. A hot plate is a similar device, which is mobile and can be used as an appropriate technology.

#### Microwave oven

A **microwave oven** (commonly referred to as a **microwave**) is an electric oven that heats and cooks food by exposing it to electromagnetic radiation in the microwave frequency range. This induces polar molecules in the food to rotate and produce thermal energy in a process known as dielectric heating. Microwave ovens heat foods quickly and efficiently because excitation is fairly uniform in the outer 25–38 mm (1–1.5 inches) of a homogeneous, high water content food item.

#### > Washing machine

A washing machine (laundry machine, clothes washer, washer, or simply wash) is a home appliance used to wash laundry. The term is mostly applied to machines that use water as opposed to dry cleaning (which uses alternative cleaning fluids and is performed by specialist businesses) or ultrasonic cleaners. The user adds laundry detergent, which is sold in liquid or powder form, to the wash water.

#### > Air conditioning

Air conditioning, often abbreviated as A/C or AC, is the process of removing heat from an enclosed space to achieve a more comfortable interior environment (sometimes referred to as 'comfort cooling') and in some cases also strictly controlling the humidity of internal air. Air conditioning can be achieved using a mechanical 'air conditioner' or alternatively a variety of other methods, including passive cooling and ventilative cooling. Air conditioning is a member of a family of systems and techniques that provide heating, ventilation, and air conditioning (HVAC). Heat pumps are similar in many ways to air conditioners, but use a reversing valve to allow them to both heat and also cool an enclosed space.

Air conditioners, which typically use vapor-compression refrigeration, range in size from small units used within vehicles or single rooms to massive units that can cool large buildings. Air source heat pumps, which can be used for heating as well as cooling, are becoming increasingly common in cooler climates.

#### > Electric kettles

In countries with 200-240 V mains electricity, electric kettles are commonly used to boil water without the necessity of a stove top. The heating element is typically fully enclosed, with a power rating of 2-3 kW. This means that the current draw for an electric kettle is up to 13 A, which is a sizeable proportion of the current available for many homes: the main fuse of most homes varies between 20 and 100 amps. In countries with 120 V mains electricity twice as much current is drawn for the same power.

In modern designs, once the water has reached boiling point, the kettle automatically deactivates, preventing the water from boiling away and damaging the heating element. A more upright design, the "jug"-style electrical kettle, can be more economical to use, since even one cup of water will keep the element covered.

#### > Food processor

A **food processor** is a kitchen appliance used to facilitate repetitive tasks in the preparation of food. Today, the term almost always refers to an electric-motor-driven appliance, although there are some manual devices also referred to as "food processors".

Food processors are similar to blenders in many forms. A food processor typically requires little to no liquid during use, and even its finely chopped products retain some texture. A blender, however, requires a set amount of liquid in order for the blade to properly blend the food, and its output is also more liquidy. Food processors are used to blend, chop, dice, and slice, allowing for quicker meal preparation.

# EXERCISE

# **Short Questions**

- 1. Write about followings:
  - Washing machine
  - Air conditioning
  - Electric stove
  - Cooktop
  - Microwave oven
- 2. Write short notes on followings:
  - Wire
  - Switches
  - Potentiometers
  - Integrated Circuits
  - Transistors
  - Diodes
  - Capacitors
  - Electrical Signals

#### Long Questions

- 1. Explain the company's policy on product's warranty, sales, installation, after sales support policy and other terms and conditions.
- 2. Explain different types of refrigerators such as traditional, frost-free, peltier with all features and functionalities of various models.
- 3. State refrigerator manufacturing capabilities of the organisation, models of the company and their respective features.
- 4. List installation-site requirements such as structural requirements, ventilation, etc.
- 5. Explain the refrigeration cycle and functioning of the appliance and its various modules, including various electromechanical parts of the refrigerator.
- 6. Describe the method of refrigeration, its use and functioning of refrigerator sealed system.
- 7. Explain types of refrigerants such as R12, R22, R134a, R290, R600a, R410, R32, use of different brazing sticks, types of brazing torches, fluxes and their application.
- 8. Describe manual-based procedure of installing the refrigerators.
- 9. Describe methods of fixing various accessories, parts that have accompanied the unit and their features.
- 10. Explain how to use the appliance and its various features/functionalities after installation.
- 11. Explain the use of test equipment and tools such as multi-meter, oscilloscope etc.
- 12. Explain safety precautions/rules, policies, procedures and quality standards to be followed.
- 13. Explain the fundamentals of electricity such as ohms law, difference between ac and dc, understanding of domestic wiring, understanding of series and parallel connections.
- 14. Explain how to rectify so as to avoid repeat fault in the refrigerator.
- 15. Describe the process of selection of appropriate spares for replacement.
- 16. Explain basic knowledge of components such as diode, transformer, LED, photo transistor, capacitor, thermistor ICs etc.
- 17. Explain components/modules of refrigerators and their prices.
- 18. Describe packaging waste disposal procedures.
- 19. State refrigerator energy ratings such as BEE rating.
- 20. State troubleshooting knowledge with respect to refrigerators.
- 21. Explain various hazards, their causes and prevention/personal safety.
- 22. Explain frequently occurring faults such as noise, water dripping and insufficient cooling, their causes and solutions.
- 23. Describe other products of the company

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सत्यमेव जयते GOVERNMENT OF INDIA MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP



# ESS

Skilling India in Electronics

# 4. Work effectively at the workplace

Unit 4.1 Effective Communication and Coordination of workUnit 4.2 Work Effectively and Maintain discipline at work.Unit 4.3 Maintain social diversity at work



ELE/N9905

# Key Learning Outcomes

#### By the end of this unit, participants will be able to:

- 1. State the importance of work ethics and workplace etiquette
- 2. State the importance of effective communication and interpersonal skills
- 3. Explain ways to maintain discipline in the workplace
- 4. Discuss the common reasons for interpersonal conflict and ways of managing them effectively.

# **UNIT 4.1: Effective Communication and Coordination at Work**

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Unit Objectives 🞯
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#### By the end of this unit, participants will be able to:

- 1. Work efffectely at the workplace.
- 2. Demonstrate practices related to gender and PwD sensitazation.

#### 4.1.1 Importance of Work Ethics and Workplace Etiquette

Workplace ethics are a set of moral and legal guidelines that organizations follow. These guidelines influence the way customers and employees interact with an organization. Workplace ethics essentially guide how an organization serves its clients and treats its employees.

For example, if a company seeks to fulfil the promises it makes, it may develop processes and set up a robust support system to address this policy and build customer/client loyalty. To achieve this goal, the company may implement specific incentive programs for employees to encourage them to produce high-quality work and ensure the organization fulfils the promises it makes to its clients/ customers.

Many organizations, often the large ones, set detailed ethical codes to guide their operations and control how the organizational processes impact the stakeholders. These ethics usually help organizations maintain certain standards of responsibility, accountability, professionalism and among others, as they navigate through different challenges and day-to-day circumstances. By following these guidelines, organizations often experience several benefits that improve the lives of stakeholders, such as customers, employees, leaders, etc.



#### **Examples of Common Workplace Ethics**

Workplace ethics are essential for a successful organization with a satisfied and loyal team. High ethical standards help in ensuring all stakeholders, such as customers, investors, employees, and other individuals involved in the workplace operations, feel the organization is safeguarding their interests. By creating and implementing ethical guidelines, organizations can keep the best interests of their employees in mind while maintaining a positive influence on those they impact through their processes. As a result, employees maintain the organization's best interests by being ethical in their daily work duties. For example, fairly-treated employees of an organization who understand the organization's commitments to environmental sustainability are usually less likely to behave in a manner that causes harm to the environment. Thus, they help maintain a positive public image of the organization. It means that workplace ethics help in maintaining reciprocal relationships that benefit organizations at large and the individuals associated with and influenced by the organizational policies.

#### **Benefits of Workplace Ethics**

There are various benefits of implementing workplace ethics. When organizations hold themselves to high ethical standards, leaders, stakeholders, and the general public can experience significant improvements. Following are some of the key benefits of employing ethics in the workplace:



## 4.1.2 Interpersonal Communication

Interpersonal communication is a process that involves sharing ideas and emotions with another person, both - verbally and non-verbally. It is essential to interact effectively with others in both personal and professional lives. In professional life or the workplace, strong interpersonal skills play a crucial role in achieving effective collaboration with colleagues.

#### **Interpersonal Skills**

Interpersonal skills, in other terms, are known as people skills, which are used to communicate and interact with others effectively. These are soft skills one uses to communicate with others and understand them. One uses these skills in daily life while interacting with people

# Activ listeningTeamworkResponsibilityDependabilityLeadershipMotvaaonFlexibilityPatenceEmpathyConflict resooluonNegoti atn

#### **Examples of Interpersonal Skills**

Fig 4.1.3 Examples of Interpersonal Skills

Numerous interpersonal skills involve communication. Communication can be verbal, such as persuasion or tone of voice — or non-verbal, such as listening and body language.

#### **Importance of Interpersonal Skills**

Interpersonal skills are essential for communicating and collaborating with groups and individuals in both personal and professional life. People with strong interpersonal skills often are able to build good relationships and also tend to work well with others. Most people often enjoy working with co-workers who have good interpersonal skills.

Among other benefits of good interpersonal skills is the ability to solve problems and make the best decisions. One can use the ability to understand others and good interpersonal communication skills to find the best solution or make the best decisions in the interest of everyone involved. Strong interpersonal skills help individuals work well in teams and collaborate effectively. Usually, people who possess good interpersonal skills also tend to be good leaders, owing to their ability to communicate well with others and motivate the people around them.

Interpersonal communicationis the key to working in a team environment and working ccollectely to achieve shared goals. Following are the interperso

#### Verbal Communication

The ability to speak clearly, appropriately and confidently can help one communicate effectively with others. It is vital to select the appropriate vocabulary and tone for the target audience.

For example – one should speak formally and professionally in the work environment, while informal language is acceptable in an intimate environment with close friends and family. Also, one should avoid using complex or technical language while communicating with an audience that may not be familiar with it. Using simple language in a courteous tone helps achieve better communication, irrespective of the audience.

#### **Active Listening**

Active listening is defined as the ability to pay complete or undivided attention to someone when they speak and understand what they are saying. It is important for effective communication because without understanding what the speaker is saying, it becomes difficult to carry forward a conversation. One should ensure to use appropriate verbal and non-verbal responses, e.g. eye contact, nodding, or smiling, to show interest in what the speaker says. Active listening is also about paying attention to the speaker's body language and visual cues. Asking and answering questions is one of the best ways to demonstrate an interest in conversing with the other person.

Active listening is critical for communicating effectively without ambiguity. It helps one understand the information or instructions being shared. It may also encourage co-workers to share their ideas, which ultimately helps achieve collaboration.

#### **Body Language**

One's expression, posture, and gestures are as important as verbal communication. One should practice open body language to encourage positivity and trust while communicating. Open body language includes - maintaining eye contact, nodding, smiling and being comfortable. On the other hand, one should avoid closed body language, e.g. crossed arms, shifting eyes and restless behaviour.

#### Empathy

Empathy is the ability to understand the emotions, ideas and needs of others from their point of view. Empathy is also known as emotional intelligence. Empathetic people are good at being aware of others' emotions and compassionate when communicating with them. Being empathetic in the workplace can be good to boost the morale of employees and improve productivity. By showing empathy, one can gain the trust and respect of others.

#### **Conflict Resolution**

One can use interpersonal communication skills to help resolve disagreements and conflicts in the workplace. This involves the application of negotiation and persuasion skills to resolve arguments between conflicting parties. It is also important to evaluate and understand both sides of the argument by listening closely to everyone involved and finding an amicable solution acceptable to all.

Good conflict resolution skills can help one contribute to creating a collaborative and positive work environment. With the ability to resolve conflicts, one can earn the trust and respect of co-workers.nal communicationskills that vital for success at work:
#### Teamwork

Employees who communicate and work well in a team often have better chances of achieving success and common goals. Being a team player can help one avoid conflicts and improve productivity. One can do this by offering to help co-workers when required and asking for their feedback and ideas. When team members give their opinions or advice, one should positively receive and react to the opinions/advice. One should be optimistic and encouraging when working in groups.

#### **Improving Interpersonal Skills**

One can develop interpersonal skills by practising good communication and setting goals for improvement. One should consider the following tips to improve their interpersonal skills:

- One should ask for feedback from co-workers, managers, family or friends to figure out what needs improvement concerning their interpersonal skills.
- One can identify the areas of interpersonal communication to strengthen by watching others.
- One can learn and improve interpersonal skills by observing co-workers, company leaders and
  professionals who possess good interpersonal skills. This includes watching and listening to them to
  note how they communicate and the body language used by them. It is vital to note their speed of
  speaking, tone of voice, and the way they engage with others. One should practice and apply such
  traits in their own interactions and relationships.
- One should learn to control their emotions. If stressed or upset, one should wait until being calm to have a conversation. One is more likely to communicate effectively and confidently when not under stress.
- One can reflect on their personal and professional conversations to identify the scope of improvement and learn how to handle conversations better or communicate more clearly. It helps to consider whether one could have reacted differently in a particular situation or used specific words or positive body language more effectively. It is also vital to note the successful and positive interactions to understand why they are successful.
- One should practice interpersonal skills by putting oneself in positions where one can build relationships and use interpersonal skills. For example, one can join groups that have organized meetings or social events. These could be industry-specific groups or groups with members who share an interest or hobby.
- Paying attention to family, friends and co-workers and making efforts to interact with them helps a lot. One should complement their family, friends and co-workers on their good ideas, hard work and achievements. Trying to understand someone's interests and showing interest in knowing them can help one build strong interpersonal skills. Offering to help someone, especially in difficult situations, helps build stronger and positive workplace relationships.
- One should avoid distractions, such as a mobile phone, while interacting with someone. Giving someone full attention while avoiding distractions helps achieve a clear exchange of ideas. By listening with focus, one can understand and respond effectively.

- One can attend appropriate courses on interpersonal skills or sign up for workshops at work to improve interpersonal skills. One can find many resources online also, such as online videos.
- For personal mentoring, one can approach a trusted family member, friend, co-worker, or current/ former employer. A person one looks up to with respect and admires is often a good choice to be selected as a mentor. One can even hire a professional career or communication coach.

Interpersonal communication skills often help one boost their morale, be more productive in the workplace, complete team projects smoothly and build positive and strong relationships with co-workers.

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## **UNIT 4.2:** Working Efffectely and Maintaining Discipline at Work

## Unit Objectives 6

#### By the end of this unit, participants will be able to:

- Discuss the importance of following organizational guidelines for dress code, time schedules, language usage and other behavioural aspects
- Explain the importance of working as per the workflow of the organization to receive instructions and report problems
- Explain the importance of conveying information/instructions as per defined protocols to the authorised persons/team members
- Explain the common workplace guidelines and legal requirements on non-disclosure and confidentiality of business-sensitive information
- Describe the process of reporting grievances and unethical conduct such as data breaches, sexual harassment at the workplace, etc.
- Discuss ways of dealing with heightened emotions of self and others.

## 4.2.1 Discipline at Work

Discipline is essential for organizational success. It helps improve productivity, reduce conflict and prevent misconduct in the workplace. It is important to have rules concerning workplace discipline and ensure that all employees comply with them. In the absence of discipline, a workplace may experience conflicts, bullying, unethical behaviour and poor employee performance. An efficient workplace disciplinary process helps create transparency in the organization. Benefits of disciplinary standards:

All employees follow the same rules which helps establish uniformity and equality in the workplace

Managers and supervisors have defined guidelines on what accon to take while initi atg disciplinary y aon

With well-defined and enforced disciplinary rules, an organiizaon can avoid various safety, security, rupati nal risks

Fig 4.2.1 Benefits of Disciplinary Standards

Maintaining an organized and cohesive workforce requires maintaining discipline in both personal and professional behaviour. It is important to follow the appropriate measures to keep employees in line without affecting their morale.

#### **Defining Discipline**

The first and crucial step in maintaining workplace discipline is to define what is meant by discipline. It helps to evaluate common discipline problems and devise guidelines for handling them effectively.



Fig 4.2.2 Examples of Workplace Discipline

According to demography and local issues, it may also include substance use and related issues.

It is vital for a workplace to have an employee handbook or company policy guide, to serve as a rulebook for employees to follow. The employee handbook/ company policy guide should be reviewed and updated periodically according to any issues or areas, or concerns identified concerning workplace discipline. Such manuals should also cover all the laws and regulations governing workplace behaviour.

Defining and documenting workplace rules aids in their implementation, ensuring little or no ambiguity. All employees in a workplace should also have easy access to the workplace guidelines so that they can refer to them to get clarity whenever required. To maintain discipline at work, it is also critical to ensure uniform application of workplace guidelines to all employees without exception.

## 4.2.2 Employee Code of Conduct

The employee code of conduct manual serves as a guide for employees to inform them regarding the behaviour expected from them at work. It helps create a good work environment with consistent behaviour from employees. The manual should list examples of acceptable and not acceptable behaviours at work. The code of conduct should be discussed with employees so that they have the clarifications required.

For example, an organization may create guidelines concerning the conduct with clients to ensure no contact is made with them except for business purposes, also prescribing the use of appropriate means of communication.

Employees should have a clear understanding concerning their job responsibilities and the behaviour expected from them with all stakeholders, e.g. company personnel, clients and associated third parties. It is critical to have documented guidelines for employees to follow concerning all aspects of work. It should also document the disciplinary action to be followed in case of non-compliance, e.g. verbal and

then written warning, temporary suspension or eventual termination of service in case of repeated noncompliance with the employee code of conduct. Employees should know what the company rules are and what will happen if they break the rules. However, disciplinary action should be initiated only when reasonably required to avoid its misuse for employee harassment.

There should also be an effective mechanism for employees to raise their concerns/ grievances and have them addressed while maintaining privacy, as required, e.g. raising concerns regarding the behaviour of a co-worker.

The employee code of conduct manual must be duly reviewed and approved by the concerned stakeholders, such as the Human Resources (HR) department and company executives.

## 4.2.3 Interpersonal Conflicts

Interpersonal conflict is any type of conflict between two or more people. These are found in both - personal and professional relationships - among friends, family, and co-workers. In the workplace, interpersonal conflict is often observed when a person or group of people interfere with another person's attempts at completing assignments and achieving goals. It is critical to resolve conflicts in the workplace to boost the morale of employees, repair working relationships among them, and improve customer satisfaction.

#### **Reasons for Workplace Conflicts**

Workplace conflicts are often observed when two or more people have different points of view. This can happen between managers, co-workers, or clients and customers. In general, interpersonal conflicts are caused by a lack of communication or unclear communication.

Some of the leading reasons for workplace conflicts are:

- Difference in values
- Personality clashes
- Poor communication

Example of poor communication – if a manager reassigns a task to another employee without communicating with the employee to whom it was originally assigned, interpersonal conflict can arise among them. This may potentially make the first employee, i.e. who was originally assigned the task, feel slighted and mistrusted by the manager. It may even cause animosity in the first employee toward the employee who has now been assigned the task.

#### **Types of Interpersonal Conflict**

Following are the four types of interpersonal conflicts:

#### a. Policy-related interpersonal conflict

When a conflict relates to a decision or situation that involves both parties, it can be called a policy-related interpersonal conflict. Example – two people or groups working on the same project, trying to adopt different approaches. To resolve policy-related interpersonal conflicts, the parties involved should try to look for a win-win situation or make a compromise. This is especially critical to resolve trivial issues so that work is not affected and common goals are achieved.

#### b. Pseudo-conflicts

Pseudo-conflict arises when two people or groups want different things and cannot reach an agreement. Pseudo-conflicts usually involve trivial disagreements that tend to hide the root of the issue.

#### c. Ego-related interpersonal conflicts

In ego conflicts, losing the argument may hurt or damage a person's pride. Sometimes ego conflicts arise when a number of small conflicts pile up on being left unresolved. To resolve ego-related conflicts, it's best to find the root of the issue and work towards a resolution.

#### d. Value-related interpersonal conflicts

Sometimes conflicts may occur between people when they have different value systems. Such conflicts can be difficult to identify initially, making the people involved think the other party is being disagreeable or stubborn, wherein they just have different values. Some co-workers may highly value their personal/ family time after office that they may be unreachable to clients during non-office hours, while others may place a high value on client satisfaction and may still be available for clients during non-office hours. Conflict may arise among such people when they may be required to coordinate to help a client during after-office hours. Value-related interpersonal conflicts are often difficult to settle since neither party likes to compromise.

#### **Resolving Interpersonal Conflicts**

Conflicts are usually likely in the workplace; they can, however, be prevented. Often resolving interpersonal conflicts through open communication helps build a stronger relationship, paving the way for effective coordination and success. Some ways to resolve interpersonal conflict:

 Communication - A great way to resolve interpersonal conflicts is for the opposing parties to listen to one another's opinions and understand their viewpoints. Meeting in person and keeping the conversation goal-oriented is important. One can have effective communication by following some measures, e.g. staying on the topic, listening actively, being mindful of the body language, maintaining eye contact, etc.

- Active Listening One should patiently listen to what the other person is saying without interrupting
  or talking over them. It helps one display empathy and get to the root of the issue. Asking questions
  to seek clarification when required helps in clear communication and conveys to the other person
  that one is listening to them. Practising active listening is a great way to improve one's
  communication skills.
- **Displaying Empathy** Listening attentively and identifying the anxieties/ issues of co-workers is a great way to show empathy and concern. It is essential to understand their feelings and actions to encourage honesty and avoid future conflict.
- Not Holding Grudges With different types of people and personalities in a workplace, it is common for co-workers to have conflicts. It is best to accept the difference in opinions and move on. Being forgiving and letting go of grudges allows one to focus on the positive side of things and perform better at work.

Work-related interpersonal conflicts can be complicated because different people have different leadership styles, personality characteristics, job responsibilities and ways in which they interact. One should learn to look above interpersonal conflicts, resolving them to ensure work goals and environment are not affected.

## **4.2.4 Importance of Following Organizational Guidelines**

Policies and procedures or organizational guidelines are essential for any organization. These provide a road map for the operations of the organization. These are also critical in ensuring compliance with the applicable laws and regulations by guiding the decision-making process and business operations. Organizational guidelines help bring uniformity to the operations of an organization, which helps reduce the risk of unwanted and unexpected events. These determine how employees are supposed to behave at work, which ultimately helps the business achieve its objectives efficiently.

However, organizational guidelines are ineffective and fail to serve their purpose if they are not followed. Many people don't like the idea of following and abiding by specific guidelines. Such people should be made to understand the benefits of following the organizational guidelines. Some of the key benefits are given below:

With well-defined organizational guidelines in place, no individual can act arbitrarily, irrespective of their position in the organization. All individuals will know the pros and cons of taking certain actions and what to expect in case of unacceptable behaviour. Benefits of following organizational guidelines:

• Consistent processes and structures - Organization guidelines help maintain consistency in operations, avoiding any disorder. When all employees follow the organizational guidelines, an organization can run smoothly. These ensure that people in different job roles operate as they are supposed to, knowing what they are responsible for, what is expected of them, and what they can expect from their supervisors and co-workers. With clarity in mind, they can do their jobs with confidence and excellence. With every person working the way intended, it's easy to minimise errors.

With all the staff following organizational guidelines, the organization has a better scope of using time and resources more effectively and efficiently. This allows the organization to grow and achieve its objectives.

- Better quality service By following organizational guidelines, employees perform their duties correctly as per the defined job responsibilities. It helps enhance the quality of the organization's products and services, helping improve the organization's reputation. Working with a reputable organization, employees can take pride in their work and know they are contributing to the reputation.
- A safer workplace When all employees follow organizational guidelines, it becomes easy to minimise workplace incidents and accidents. It reduces the liabilities associated with risks for the organization and limits the interruptions in operations. Employees also feel comfortable and safe in the workplace, knowing their co-workers are ensuring safety at work by following the applicable guidelines.

Different organizations may have different guidelines on dress code, time schedules, language usage, etc. For example – certain organizations in a client-dealing business requiring employees to meet clients personally follow a strict dress code asking their employees to wear formal business attire. Similarly, organizations operating in specific regions may require their employees to use the dominant regional language of the particular region to build rapport with customers and serve them better. Certain organizations, such as banks, often give preference to candidates with knowledge of the regional language during hiring.

Working hours may also differ from one organization to another, with some requiring employees to work extra compared to others. One should follow the organizational guidelines concerning all the aspects of the employment to ensure a cohesive work environment.

## 4.2.5 Workflow

Workflow is the order of steps from the beginning to the end of a task or work process. In other words, it is the way a particular type of work is organised or the order of stages in a particular work process.

Workflows can help simplify and automate repeatable business tasks, helping improve efficiency and minimise the room for errors. With workflows in place, managers can make quick and smart decisions while employees can collaborate more productively.

Other than the order that workflows create in a business, these have several other benefits, such as:

• Identifying Redundancies - Mapping out work processes in a workflow allows one to get a clear, toplevel view of a business. It allows one to identify and remove redundant or unproductive processes.

Workflow gives greater insights into business processes. Utilizing such useful insights, one can improve work processes and the bottom line of the business. In many businesses, there are many unnecessary and redundant tasks that take place daily. Once an organization has insight into its processes while preparing workflow, it can determine which activities are really necessary.

Identifying and eliminating redundant tasks creates value for a business. With redundant tasks and processes eliminated, an organization can focus on what's important to the business.

Increase in Accountability and Reduction in Micromanagement - Micromanagement often causes
problems in a business setting as most employees don't like being micromanaged, and even many
managers don't like the practice. Micromanagement is often identified as one of the reasons why
people quit their job.

However, the need for micromanagement can be minimized by clearly mapping out the workflow. This way, every individual in a team knows what tasks need to be completed and by when and who is responsible for completing them. This makes employees more accountable also.

With clearly defined workflow processes, managers don't have to spend much time micromanaging their employees, who don't have to approach the manager to know what the further steps are. Following a workflow, employees know what is going on and what needs to be done. This, in turn, may help increase the job satisfaction of everyone involved while improving the relationships between management and employees.

- Improved Communication Communication at work is critical because it affects all aspects of an
  organization. There are instances when the main conflict in an organization originates from
  miscommunication, e.g. the management and employees disagreeing on an aspect, despite
  pursuing the same objectives. Poor communication is a common workplace issue that is often not
  dealt with.
- This highlights why workflow is important. Workplace communication dramatically can increase with the visibility of processes and accountability. It helps make the daily operations smoother overall.

Better Customer Service - Customers or clients are central to a business. Therefore, it is imperative
to find and improve ways to improve customer experience. Relying on outdated manual systems
may cause customer requests or complaints to be overlooked, with dissatisfied customers taking
their business elsewhere. However, following a well-researched and defined workflow can help
improve the quality of customer service.

By automating workflows and processes, an organization can also reduce the likelihood of human error. This also helps improve the quality of products or services over time, resulting in a better customer experience.

## 4.2.6 Following Instructions and Reporting Problems

All organizations follow a hierarchy, with most employees reporting to a manager or supervisor. For organizational success, it is vital for employees to follow the instructions of their manager or supervisor. They should ensure they perform their duties as per the given instructions to help achieve the common objectives of the organization and deliver quality service or products. This consequently helps maintain the reputation of the organization.

It is also important to be vigilant and identify problems at work or with the organizational work processes. One should deal with the identified within their limits of authority and report out of authority problems to the manager/ supervisor or the concerned person for a prompt resolution to minimise the impact on customers/clients and business.

## **4.2.7 Information or D** ta Sharing

Information or data is critical to all organizations. Depending on the nature of its business, an organization may hold different types of data, e.g. personal data of customers or client data concerning their business operations and contacts. It is vital to effective measures for the appropriate handling of different types of data, ensuring its protection from unauthorized access and consequent misuse.

One should access certain data only if authorised to do so. The same is applicable when sharing data which must be shared only with the people authorised to receive it to use it for a specific purpose as per their job role and organizational guidelines. For example – one should be extra cautious while sharing business data with any third parties to ensure they get access only to the limited data they need as per any agreements with them. It is also critical to monitor how the recipient of the data uses it, which should strictly be as per the organizational guidelines. It is a best practice to share appropriate instructions with the recipient of data to ensure they are aware of the purpose with which data is being shared with them and how they are supposed to use and handle it. Any misuse of data must be identified and reported promptly to the appropriate person to minimise any damage arising out of data misuse.

These days most organizations require their employees and business partners or associated third parties to sign and accept the relevant agreement on the non-disclosure of business-sensitive information. In simple terms, business-sensitive information is confidential information. It is proprietary business information collected or created during the course of conducting business, including information about the business, e.g. proposed investments, intellectual property, trade secrets, or plans for a merger and information related to its clients. Business-sensitive information may sometimes also include information regarding a business's competitors in an industry.

The release of business-sensitive information to competitors or the general public poses a risk to a business. For example, information regarding plans for a merger could be harmful to a business if a competitor gets access to it.

## 4.2.8 Reporting Issues at Work

Most organizations have defined guidelines on appropriate reporting processes to be followed for reporting different types of issues. For example – one can report any grievances or dissatisfaction concerning co-workers to their manager/supervisor, e.g. data breaches or unethical conduct. If the concern is not addressed, then the employee should follow the organizational guidelines and hierarchy for the escalation of such issues that are not addressed appropriately.

For example – any concern related to sexual harassment at the workplace should be escalated to the concerned spokesperson, such as Human Resources (HR) representative, and if not satisfied with the action taken, it should be reported to the senior management for their consideration and prompt action.

## **4.2.9** Dealing with Heightened Emotions

Humans are emotional beings. There may be occasions when one is overwhelmed by emotions and is unable to suppress them. However, there may be situations when one must manage emotions well, particularly at work.

Stress in one's personal and professional life may often cause emotional outbursts at work. Managing one's emotions well, particularly the negative ones, is often seen as a measure of one's professionalism. Anger, dislike, frustration, worry, and unhappiness are the most common negative emotions experienced at work.

#### Ways to manage negative emotions at work:

 Compartmentalisation – It's about not confining emotions to different aspects of one's life. For example, not letting negative emotions from personal life affect work-life and vice versa. One should try to leave personal matters and issues at home. One should train their mind to let go of personal matters before reaching work. Similarly, one can compartmentalise work-related stresses so that negative emotions from work don't affect one's personal life.

- Deep breathing and relaxation Deep breathing helps with anxiety, worry, frustration and anger.
   One should take deep breaths, slowly count to ten inhaling and exhaling until one calms down.
   One can also take a walk to calm down or listen to relaxing music. Talking to someone and sharing concerns also helps one calm down.
- **The 10-second rule** This is particularly helpful in controlling anger and frustration. When one feels their temper rising, they should count to 10 to calm down and recompose. If possible, one should move away to allow temper to come down.
- **Clarify** It is always good to clarify before reacting, as it may be a simple case of misunderstanding or miscommunication.
- **Physical activity** Instead of losing temper, one should plan to exercise, such as running or going to the gym, to let the anger out. Exercise is also a great way to enhance mood and release any physical tension in the body.
- **Practising restraint** One should avoid replying or making a decision when angry, not allowing anger or unhappiness to cloud one's judgement. It may be best to pause any communication while one is angry, e.g. not communicating over email when angry or upset.
- Knowing one's triggers It helps when one is able to recognise what upsets or angers them. This way, one can prepare to remain calm and plan their reaction should a situation occur. One may even be able to anticipate the other party's reaction.
- **Be respectful** One should treat their colleagues the same way one would like to be treated. If the other person is rude, one need not reciprocate. It is possible to stay gracious, firm and assertive without being aggressive. Sometimes, rude people back away when they don't get a reaction from the person they are arguing with.
- Apologise for any emotional outburst Sometimes, one can get overwhelmed by emotions, reacting with an emotional outburst. In such a case, one should accept responsibility and apologise immediately to the affected persons without being defensive.
- **Doing away with negative emotions** It is recommended to let go of anger, frustration and unhappiness at the end of every workday. Harbouring negative emotions affects one emotionally, affecting their job performance also. Engaging in enjoyable activities after work is a good stress reliever.

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## **UNIT 4.3: Maintaining Social Diversity at Work**



#### By the end of this unit, participants will be able to:

- 1. Explain the concept and importance of gender sensitivity and equality.
- 2. Discuss ways to create sensitivity for different genders and Persons with h Disabiliti (PwD).

## 4.3.1 Gender Sensitivity -

Gender sensitivity is the act of being sensitive towards people and their thoughts regarding gender. It ensures that people know the accurate meaning of gender equality, and one's gender should not be given priority over their capabilities.



Fig 4.3.1 Gender Equality

Women are an important source of labour in many sectors, yet they have limited access to resources and benefits. Women should receive the same benefits and access to resources as men. A business can improve its productivity and quality of work by providing better support and opportunities to women.

#### **Important Terms**

- **Gender Sensitivity-** Gender sensitivity is the act of being sensitive to the ways people think about gender.
- **Gender Equality** It means persons of any gender enjoy equal opportunities, responsibilities, and rights in all areas of life.
- **Gender Discrimination** It means treating an individual unequally or disadvantageously based on their gender, e.g. paying different wages to men and women for similar or equal job positions.

#### **Strategies for Enhancing Gender Equity**

To enhance gender equity, one should:

- Follow gender-neutral practices at all levels at work.
- Participate together in decision-making.
- Help in promoting women's participation in different forums.
- Assist women in getting exposure to relevant skills and practices.
- Assist women in capacity building by mentoring, coaching or motivating them, as appropriate.
- Assist in the formation and operation of women support groups.
- Assist in the implementation of women-centric programmes.
- Combine technical training with reproductive health and nutrition for coffee farming households.
- Assist in making a work environment that is healthy, safe, and free from discrimination.

#### **Bridging Gender Differences**

Men and women react and communicate very differently. Thus, there are some work differences as both genders have their style and method of handling a situation.

Although, understanding and maturity vary from person to person, even between these genders, based on their knowledge, education, experience, culture, age, and upbringing, as well as how one's brain functions over a thought or problem.

#### In order to bridge the gap, one should:

- Not categorize all men and women in one way.
- Be aware of the verbal and non-verbal styles of communication of every gender to avoid any miscommunication and work better.
- Be aware of partial behaviour and avoid it.
- Encourage co-workers of different genders to make room by providing space to others.

#### Ways to reduce Gender Discrimination

- Effective steps against sexual harassment by the concerned authorities and general public.
- Gender stereotypes are how society expects people to act based on their gender. This can only be reduced by adopting appropriate behaviour and the right attitude.
- Objectification of females must be abolished.

#### Ways to Promote Gender Sensitivity in the Workplace

Practices that promote gender diversity should be adopted and promoted.

- All genders should receive equal responsibilities, rights, and privileges.
- All genders should have equal pay for similar or the same job roles/ positions.
- Strict and effective workplace harassment policies should be developed and implemented.
- An open-minded and stress-free work environment should be available to all the employees, irrespective of their gender.
- Women should be encouraged to go ahead in every field of work and assume leadership roles.
- Follow appropriate measures for women's empowerment.
- Men should be taught to be sensitive to women and mindful of their rights.

## 4.3.2 PwD Sensitivity –

Some individuals are born with a disability, while others may become disabled due to an accident, illness or as they get old. People with Disabilities (PwD) may have one or more areas in which their functioning is affected. A disability can affect hearing, sight, communication, breathing, understanding, mobility, balance, and concentration or may include the loss of a limb. A disability may contribute to how a person feels and affect their mental health

#### Important Terms

•Persons with Disabilities (PwD) – Persons with Disabilities means a person suffering from not less than 40% of any disability as certified by a medical authority.

#### •Types of Disability:

- a. Blindness Visually impaired
- b. Low Vision
- c. Leprosy Cured
- d. Hearing impairment
- e. Locomotor disability
- f. Mental retardation
- g. Mental illness

#### **PwD Sensitivity**

PwD sensitivity promotes empathy, etiquette and equal participation of individuals and organizations while working with individuals with a disability, e.g. sensory, physical or intellectual.

#### Ways to be PwD Sensitive

#### To be sensitive to PwD, one should:

- Be respectful to all Persons with Disabilities (PwD) and communicate in a way that reflects PwD sensitivity.
- Always be supportive and kind towards a PwD with their daily chores.
- Be ready to assist a PwD to help them avail of any benefit/ livelihood opportunity/ training or any kind that helps them grow.
- Encourage and try to make things easier and accessible to PwD so that they can work without or with minimum help.
- Protest where feasible and report any wrong act/behaviour against any PwD to the appropriate authority.
- Learn and follow the laws, acts, and policies relevant to PwD.

#### **Appropriate Verbal Communication**

As part of appropriate verbal communication with all genders and PwD, one should:

- Talk to all genders and PwD respectfully, maintaining a normal tone of voice with appropriate politeness. It is important to ensure one's tone of voice does not have hints of sarcasm, anger, or unwelcome affection.
- Avoid being too self-conscious concerning the words to use while also ensuring not to use words that imply one's superiority over the other.
- Make no difference between a PwD and their caretaker. Treat PwD like adults and talk to them directly.
- Ask a PwD if they need any assistance instead of assuming they need it and offering assistance spontaneously.

#### **Appropriate Non-verbal Communication**

Non-verbal communication is essentially the way someone communicates through their body language. These include:

- Facial expressions The human face is quite expressive, capable of conveying many emotions without using words. Facial expressions must usually be maintained neutral and should change according to the situation, e.g. smile as a gesture of greeting.
- **Body posture and movement** One should be mindful of how to sit, stand, walk, or hold their head. For example - one should sit and walk straight in a composed manner. The way one moves and carries self, communicates a lot to others. This type of non-verbal communication includes one's posture, bearing, stance, and subtle movements.

- **Gestures** One should be very careful with their gestures, e.g. waving, pointing, beckoning, or using one's hands while speaking. One should use appropriate and positive gestures to maintain respect for the other person while being aware that a gesture may have different meanings in different cultures.
- Eye contact Eye contact is particularly significant in non-verbal communication. The way someone looks at someone else may communicate many things, such as interest, hostility, affection or attraction. Eye contact is vital for maintaining the flow of conversation and for understanding the other person's interest and response. One should maintain appropriate eye contact, ensuring not to stare or look over the shoulders. To maintain respect, one should sit or stand at the other person's eye level to make eye contact.
- **Touch** Touch is a very sensitive type of non-verbal communication. Examples are handshakes, hugs, pat on the back or head, gripping the arm, etc. A firm handshake indicates interest, while a weak handshake indicates the opposite. One should be extra cautious not to touch others inappropriately and avoid touching them inadvertently by maintaining a safe distance.

#### **Rights of PwD**

PwD have the right to respect and human dignity. Irrespective of the nature and seriousness of their disabilities, PwD have the same fundamental rights as others, such as:

- Disabled persons have the same civil and political rights as other people
- Disabled persons are entitled to the measures designed to enable them to become as selfdependent as possible
- Disabled persons have the right to economic and social security
- Disabled persons have the right to live with their families or foster parents and participate in all social and creative activities.
- Disabled persons are protected against all exploitation and treatment of discriminatory and abusive nature.

#### Making Workplace PwD Friendly

- One should not make PwD feel uncomfortable by giving too little or too much attention
- One should use a normal tone while communicating with a PwD and treat them as all others keeping in mind their limitations and type of disability
- Any help should be provided only when asked for by a PwD
- One should help in ensuring the health and well-being of PwD.

#### **Expected Employer Behaviour**

Some of the common behavioural traits that employees expect from their employers are:

- Cooperation: No work is successful without cooperation from the employer's side. Cooperation helps to understand the job role better and complete it within the given timeline.
- Polite language: Polite language is always welcomed at work. This is a basic aspect that everybody expects.
- Positive Attitude: Employers with a positive attitude can supervise the work of the employees and act as a helping hand to accomplish the given task. A person with a positive attitude looks at the best qualities in others and helps them gain success.
- Unbiased behaviour: Employers should always remain fair towards all their employees. One should not adopt practices to favour one employee while neglecting or ignoring the other. This might create animosity among co-workers.
- Decent behaviour: The employer should never improperly present oneself before the employee. One should always respect each other's presence and behave accordingly. The employer should not speak or act in a manner that may make the employee feel uneasy, insulted, and insecure.

## Exercise 📝

- 1. List down three examples of workplace ethics.
- 2. List down three examples of interpersonal skills.
- 3. Identify two reasons for workplace conflicts.
- 4. Identify two ways of resolving interpersonal conflicts
- 5. List down two ways of dealing with heightened emotions at work.
- 6. List down two types of non-verbal communication.

– Notes 🗐 –



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ESSCC Skilling India in Electronics

# 5. Apply health and safety practices at the workplace

Unit 5.1 Workplace HazardsUnit 5.2 Fire SafetyUnit 5.3 First AidUnit 5.4 Waste Management



ELE/N1002

## Key Learning Outcomes

#### By the end of this module, participa ts will be able to:

- 1. Discuss job-site hazards, risks and accidents
- 2. Explain the organizational safety procedures for maintaining electrical safety, handling tools and hazardous materials
- 3. Describe how to interpret warning signs while accessing sensitive work areas
- 4. Explain the importance of good housekeeping
- 5. Describe the importance of maintaining appropriate postures while lifting heavy objects
- 6. List the types of fire and fire extinguishers
- 7. Describe the concept of waste management and methods of disposing of hazardous waste
- 8. List the common sources of pollution and ways to minimize them
- 9. Elaborate on electronic waste disposal procedures
- 10. Explain how the administer appropriate first aid to victims in case of bleeding, burns, choking, electric shock, poisoning and also administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock

## **UNIT 5.1: Workplace Hazards**



#### By the end of this unit, participants will be able to:

- Discuss job-site hazards, risks and accidents
- Explain the organizational safety procedures for maintaining electrical safety, handling tools and hazardous materials
- Describe how to interpret warning signs while accessing sensitive work areas
- Explain the importance of good housekeeping
- Describe the importance of maintaining appropriate postures while lifting heavy objects
- Explain safe handling of tools and Personal Protective Equipment to be used.

## 5.1.1 Workplace Safety —

Workplace safety is important to be established for creating a safe and secure working for the workers. The workplace has to be administered as per the rules of the Occupational Safety and Health Administration (OSHA). It refers to monitoring the working environment and all hazardous factors that impact employees' safety, health, and well-being. It is important to provide a safe working environment to the employees to increase their productivity, wellness, skills, etc.

#### The benefits of workplace safety are:

- Employee retention increases if they are provided with a safe working environment.
- Failure to follow OSHA's laws and guidelines can result in significant legal and financial consequences.
- A safe environment enables employees to stay invested in their work and increases productivity.
- Employer branding and company reputation can both benefit from a safe working environment.

## 5.1.2 Workplace Hazards —

#### 5.1.2. Workplace Hazards

A workplace is a situation that has the potential to cause harm or injury to the workers and damage the tools or property of the workplace. Hazards exist in every workplace and can come from a variety of sources. Finding and removing them is an important component of making a safe workplace.

#### **Common Workplace Hazards**

The common workplace hazards are:

·Biological: The threats caused by biological agents like viruses, bacteria, animals, plants, insects and also humans, are known as biological hazards.

- **Chemical:** Chemical hazard is the hazard of inhaling various chemicals, liquids and solvents. Skin irritation, respiratory system irritation, blindness, corrosion, and explosions are all possible health and physical consequences of these dangers.
- **Mechanical:** Mechanical Hazards comprise the injuries that can be caused by the moving parts of machinery, plant or equipment.
- **Psychological:** Psychological hazards are occupational hazards caused by stress, harassment, and violence.
- **Physical:** The threats that can cause physical damage to people is called physical hazard. These include unsafe conditions that can cause injury, illness and death.
- **Ergonomic:** Ergonomic Hazards are the hazards of the workplace caused due to awkward posture, forceful motion, stationary position, direct pressure, vibration, extreme temperature, noise, work stress, etc.

#### Workplace Hazards Analysis

A workplace hazard analysis is a method of identifying risks before they occur by focusing on occupational tasks. It focuses on the worker's relationship with the task, the tools, and the work environment. After identifying the hazards of the workplace, organisations shall try to eliminate or minimize them to an acceptable level of risk.

#### **Control Measures of Workplace Hazards**

Control measures are actions that can be taken to reduce the risk of being exposed to the hazard. Elimination, Substitution, Engineering Controls, Administrative Controls, and Personal Protective Equipment are the five general categories of control measures.

- Elimination: The most successful control technique is to eliminate a specific hazard or hazardous work procedure or prevent it from entering the workplace.
- **Substitution:** Substitution is the process of replacing something harmful with something less hazardous. While substituting the hazard may not eliminate all of the risks associated with the process or activity, it will reduce the overall harm or health impacts.
- **Engineering Controls:** Engineered controls protect workers by eliminating hazardous situations or creating a barrier between the worker and the hazard, or removing the hazard from the person.
- Administrative Controls: To reduce exposure to hazards, administrative controls limit the length of time spent working on a hazardous task that might be used in combination with other measures of control.
- **Personal Protective Equipment:** Personal protective equipment protects users from health and safety hazards at work. It includes items like safety helmets, gloves, eye protection, etc.

## 5.1.3 Risk for a Drone Technician

A drone technician may require to repair the propeller, motor and its mount, battery, mainboards, processor, booms, avionics, camera, sensors, chassis, wiring and landing gear. A technician may face some risks while repairing the drones' equipment.

- The technician is susceptible to being physically harmed by propellers.
- Direct contact with exposed electrical circuits can injure the person.
- If the skin gets in touch with the heat generated from electric arcs, it burns the internal tissues.
- Major electrical injuries can occur due to poorly installed electrical equipment, faulty wiring, overloaded or overheated outlets, use of extension cables, incorrect use of replacement fuses, use of equipment with wet hands, etc.

## 5.1.4 Workplace Warning Signs

A Hazard sign is defined as 'information or instruction about health and safety at work on a signboard, an illuminated sign or sound signal, a verbal communication or hand signal.'

There are four different types of safety signs:

- Prohibition / Danger Alarm Signs
- Mandatory Signs
- Warning Signs
- And Emergency

**1. Prohibition Signs:** A "prohibition sign" is a safety sign that prohibits behaviour that is likely to endanger one's health or safety. The colour red is necessary for these health and safety signs. Only what or who is forbidden should be displayed on a restriction sign.



Fig. 5.1.1. Prohibition arning Signs

#### 2. Mandatory Signs:

Mandatory signs give clear directions that must be followed. The icons are white circles that have been reversed out of a blue circle. On a white background, the text is black.



Fig. 5.1.2. Mandatory Signs

#### 3. Warning Signs

Warning signs are the safety information communicaatio signs. They are shown as a 'yellow colour triangle'.



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#### 4. Emergency Signs

The locationor routes to emergency ffacilitieare indicated by emergency signs. These signs have a green backdrop with a white emblem or writing. These signs convey basic informatioand frequently refer to housekeeping, company procedures, or logistics.



Fig. 5.1.4. Emergency Signs

## **5.1.5 Cleanliness in the Workplace**

Workplace cleanliness maintenance creates a healthy, efficient and productive environment for the employees. Cleanliness at the workplace is hindered by some elements like cluttered desks, leftover food, waste paper, etc. A tidy workplace is said to improve employee professionalism and enthusiasm while also encouraging a healthy working environment.

#### Benefits of cleanliness in the workplace:

- 1. Productivity: Cleanliness in the workplace can bring a sense of belonging to the employees, also motivating and boosting the morale of the employees. This results in increasing their productivity.
- 2. Employee Well-being: Employee well-being can be improved by providing a clean work environment. Employees use fewer sick days in a workplace where litter and waste are properly disposed of, and surfaces are cleaned regularly, resulting in increased overall productivity.
- 3. Positive Impression: Cleanliness and orderliness in the workplace provide a positive impression on both employees and visitors.
- 4. Cost saving: By maintaining acceptable levels of cleanliness in the workplace, businesses can save money on cleaning bills and renovations, which may become necessary if the premises are not properly kept.

#### **Reasons for Cleaning the Workplace**

- Cleaning of dry floors, mostly to prevent workplace slips and falls.
- Disinfectants stop bacteria in their tracks, preventing the spread of infections and illness.
- Proper air filtration decreases hazardous substance exposures such as dust and fumes.
- Light fixture cleaning improves lighting efficiency.
- Using environmentally friendly cleaning chemicals that are safer for both personnel and the environment.
- Work environments are kept clean by properly disposing of garbage and recyclable items.

## **5.1.6 Lifting and Handling of Heavy Loads**

Musculoskeletal Injuries (MSIs), such as sprains and strains, can occur while lifting, handling, or carrying objects at work. When bending, twisting, uncomfortable postures and lifting heavy objects are involved, the risk of injury increases. Ergonomic controls can help to lower the risk of injury and potentially prevent it.

Types of injuries caused while lifting heavy objects:

- Cuts and abrasions are caused by rough surfaces.
- Crushing of feet or hands.
- Strain to muscles and joints



Fig. 5.1.5. Lifting loads echnique

#### **Preparing to lift**

A load that appears light enough to bear at first will grow increasingly heavier as one carries it further. The person carrying the weight should be able to see over or around it at all times.

The amount of weight a person can lift, depends on their age, physique, and health

It also depends on whether or not the person is used to lifting and moving hefty objects.

#### **Common Causes of Back Injuries**

The Most Common Causes of Back Injuries are:

- 1) Inadequate Training: The individual raising the load receives no sufficient training or guidance.
- **2)** Lack of awareness of technique: The most common cause of back pain is incorrect twisting and posture, which causes back strain.
- **3)** Load size: The load size to consider before lifting. If the burden is too much for one's capacity or handling, their back may be strained and damaged.
- **4) Physical Strength:** Depending on their muscle power, various persons have varied physical strengths. One must be aware of their limitations.
- **5) Teamwork:** The operation of a workplace is all about working together. When opposed to a single person lifting a load, two people can lift it more easily and without difficulty. If one of two people isn't lifting it properly, the other or both of them will suffer back injuries as a result of the extra strain.

#### **Techniques for Lifting Heavy Objects**

Тес	hnique	Demonstraton	
1.	Ensure one has a wide base of support before lifting the heavy object. Ensure one's feet are shoulder-width apart, and one foot is slightly ahead of the other at all times. This will help one maintain a good balance during the lifting of heavy objects. This is known as the Karate Stance.		
2.	Squat down as near to the object as possible when one is ready to lift it, bending at the hips and knees with the buttocks out. If the object is really heavy, one may wish to place one leg on the floor and the other bent at a straight angle in front of them.		





<sup>3</sup>Source:https://ww .braceability.ccom/blogs/articles/7-prop-heavavy-liftinechniques

## **5.1.7 Safe Handling of Tools**

Workers should be trained on how to use tools safely. When tools are misplaced or handled incorrectly by workers, they can be dangerous. The following are some suggestions from the National Safety Council for safe tool handling when they are not in use:

- Never carry tools up or down a ladder in a way that makes it difficult to grip them. Instead of being carried by the worker, tools should be lifted up and down using a bucket or strong bag.
- Tools should never be tossed but should be properly passed from one employee to the next. Pointed tools should be passed with the handles facing the receiver or in their carrier.
- When turning and moving around the workplace, workers carrying large tools or equipment on their shoulders should pay particular attention to clearances.
- Pointed tools such as chisels and screwdrivers should never be kept in a worker's pocket. They can be carried in a toolbox, pointing down in a tool belt or pocket tool bag, or in hand with the tip always held away from the body.
- Tools should always be stored while not in use. People below are put in danger when tools are left sitting around on an elevated structure, such as a scaffold. In situations when there is a lot of vibration, this risk increases.

## **5.1.8 Personal Protective Equipment**

Personal protective equipment, or "PPE," is equipment worn to reduce exposure to risks that might result in significant occupational injuries or illnesses. Chemical, radiological, physical, electrical, mechanical, and other job dangers may cause these injuries and diseases.

#### PPE used for protection fom the following injuries are:

Injury Protecton	Protecton	PPE
Head Injury Protecton	Falling or flying objects, stationary objects, or contact with electrical wires can cause impact, penetration, and electrical injuries. Hard hats can protect one's head from these injuries. A common electrician's hard hat is shown in the figure below. This hard hat is made of nonconductive plastic and comes with a set of safety goggles.	
Foot and Leg Injury Protecton	In addition to foot protection and safety shoes, leggings (e.g., leather) can guard against risks such as falling or rolling objects, sharp objects, wet and slippery surfaces, molten metals, hot surfaces, and electrical hazards.	
Eye and Face Injury Protecton	Spectacles, goggles, special helmets or shields, and spectacles with side shields and face shields can protect against the hazards of flying fragments, large chips, hot sparks, radiation, and splashes from molten metals. They also offer protection from particles, sand, dirt, mists, dust, and glare.	

Protecton against Hearing Loss	Hearing protection can be obtained by wearing earplugs or earmuffs. High noise levels can result in permanent hearing loss or damage, as well as physical and mental stress. Self- forming earplugs composed of foam, waxed cotton, or fibreglass wool usually fit well. Workers should be fitted for moulded or prefabricated earplugs by a specialist.	
Hand Injury Protecton	Hand protection will aid workers who are exposed to dangerous substances by skin absorption, serious wounds, or thermal burns. Gloves are a frequent protective clothing item. When working on electrified circuits, electricians frequently use leather gloves with rubber inserts. When stripping cable with a sharp blade, Kevlar gloves are used to prevent cuts.	
Whole Body Protecton	Workers must protect their entire bodies from risks such as heat and radiation. Rubber, leather, synthetics, and plastic are among the materials used in whole-body PPE, in addition to fire-retardant wool and cotton. Maintenance staff who operate with high-power sources such as transformer installations and motor- control centres are frequently obliged to wear fire-resistant clothes.	

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### **UNIT 5.2: Fire Safety**



By the end of this unit, participants will be able to:

1. List the types of fire and fire e extinguiss.

### 5.2.1 Fire Safety —

Fire safety is a set of actions aimed at reducing the amount of damage caused by fire. Fire safety procedures include both those that are used to prevent an uncontrolled fire from starting and those that are used to minimise the spread and impact of a fire after it has started. Developing and implementing fire safety measures in the workplace is not only mandated by law but is also essential for the protection of everyone who may be present in the building during a fire emergency.

The basic Fire Safety Responsibilities are:

- To identify risks on the premises, a fire risk assessment must be carried out.
- Ascertain that fire safety measures are properly installed.
- Prepare for unexpected events.
- Fire safety instructions and training should be provided to the employees.

### 5.2.2 Respond to a Workplace Fire

- Workplace fire drills should be conducted on a regular basis.
- If one has a manual alarm, they should raise it.
- Close the doors and leave the fire-stricken area as soon as possible. Ensure that the evacuation is quick and painless.
- Turn off dangerous machines and don't stop to get personal items.
- Assemble at a central location. Ascertain that the assembly point is easily accessible to the employees.
- If one's clothing catches fire, one shouldn't rush about it. They should stop and descend on the ground and roll to smother the flames if their clothes catch fire.

### 5.2.3 Fire Extinguisher -

Fire extinguishers are portable devices used to put out small flames or minimise their damage until fire-fighters arrive. These are maintained on hand in locations such as fire stations, buildings, workplaces, public transit, and so on. The types and quantity of extinguishers that are legally necessary for a given region are determined by the applicable safety standards.

Types of fire extinguishers are:

#### There are five main types of fire extinguishers:

- 1. Water.
- 2. Powder.
- 3. Foam.
- 4. Carbon Dioxide (CO2).
- 5. Wet chemical.
- **1. Water:** Water fire extinguishers are one of the most common commercial and residential fire extinguishers on the market. They're meant to be used on class-A flames.
- **2. Powder:** The L2 powder fire extinguisher is the most commonly recommended fire extinguisher in the Class D Specialist Powder category, and is designed to put out burning lithium metal fires.
- **3.** Foam: Foam extinguishers are identified by a cream rectangle with the word "foam" printed on it. They're mostly water-based, but they also contain a foaming component that provides a quick knock-down and blanketing effect on flames. It suffocates the flames and seals the vapours, preventing re-ignition.
- 4. Carbon Dioxide (CO2): Class B and electrical fires are extinguished with carbon dioxide extinguishers, which suffocate the flames by removing oxygen from the air. They are particularly beneficial for workplaces and workshops where electrical fires may occur since, unlike conventional extinguishers, they do not leave any toxins behind and hence minimise equipment damage.









5. Wet Chemical: Wet chemical extinguishers are designed to put out fires that are classified as class F. They are successful because they can put out extremely high-temperature fires, such as those caused by cooking oils and fats.



- Notes

### **UNIT 5.3: First Aid**



#### By the end of this unit, participants will be able to:

- 1. Explain how the administer appropriate first aid to victims in case of bleeding, burns, choking, electric shock, poisoning
- 2. Explain how to administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock.

### 5.3.1 First Aid \_\_\_\_\_

First aid is the treatment or care given to someone who has sustained an injury or disease until more advanced care can be obtained or the person recovers.

The aim of first aid is to:

- Preserve life
- Prevent the worsening of a sickness or injury
- If at all possible, relieve pain
- Encourage recovery
- Keep the unconscious safe.

First aid can help to lessen the severity of an injury or disease, and in some situations, it can even save a person's life.

### 5.3.2 Need for First Aid at the Workplace —

- In the workplace, first aid refers to providing immediate care and life support to persons who have been injured or become unwell at work.
- Many times, first aid can help to lessen the severity of an accident or disease.
- It can also help an injured or sick person relax. In life-or-death situations, prompt and appropriate first aid can make all the difference.

### 5.3.2 Need for First Aid at the Workplace

In the workplace, first aid refers to providing immediate care and life support to persons who have been injured or become unwell at work.

Many times, first aid can help to lessen the severity of an accident or disease.

It can also help an injured or sick person relax. In life-or-death situations, prompt and appropriate first aid can make all the difference.

### 5.3.3 Treating Minor Cuts and Scapes

Steps to keep cuts clean and prevent infectionsand scars:

- Wash Hands: Wash hands first with soap and water to avoid introducing bacteria into the cut and causing an infection. One should use the hand sanitiser if one is on the go.
- **Stop the bleeding:** Using a gauze pad or a clean towel, apply pressure to the wound. For a few minutes, keep the pressure on.
- Clean Wounds: Once the bleeding has stopped, clean the wound by rinsing it under cool running
  water or using a saline wound wash. Use soap and a moist washcloth to clean the area around the
  wound. Soap should not be used on the cut since it may irritate the skin. Also, avoid using hydrogen
  peroxide or iodine, as these may aggravate the wound.
- **Remove Dirt:** Remove any dirt or debris from the area. Pick out any dirt, gravel, glass, or other material in the cut with a pair of tweezers cleaned with alcohol.

### 5.3.4 Heart Atack

When the blood flow carrying oxygen to the heart is blocked, a heart attack occurs. The heart muscle runs out of oxygen and starts to die.

Symptoms of a heart attack can vary from person to person. They may be mild or severe. Women, older adults, and people with diabetes are more likely to have subtle or unusual symptoms.

#### Symptoms in adults may include:

- Changes in mental status, especially in older adults.
- Chest pain that feels like pressure, squeezing, or fullness. The pain is most often in the centre of the chest. It may also be felt in the jaw, shoulder, arms, back, and stomach. It can last for more than a few minutes or come and go.
- Cold sweat.
- Light-headedness.
- Nausea (more common in women).
- Indigestion.

- Vomiting.
- Numbness, aching or tingling in the arm (usually the left arm, but the right arm may be affected alone, or along with the left).
- Shortness of breath
- Weakness or fatigue, especially in older adults and in women.

#### **First Aid for Heart Attack**

If one thinks someone is experiencing a heart attack, they should:

- Have the person sit down, rest, and try to keep calm.
- Loosen any tight clothing.
- Ask if the person takes any chest pain medicine, such as nitro-glycerine for a known heart condition, and help them take it.
- If the pain does not go away promptly with rest or within 3 minutes of taking nitro-glycerine, call for emergency medical help.
- If the person is unconscious and unresponsive, call 911 or the local emergency number, then begin CPR.
- If an infant or child is unconscious and unresponsive, perform 1 minute of CPR, then call 911 or the local emergency number.

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### **UNIT 5.4: Waste Management**

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Unit Objectives 6
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#### By the end of this unit, participants will be able to:

- 1. Describe the concept of waste management and methods of disposing of hazardous waste.
- 2. List the common sources of pollutionand ways to minimize them.
- 3. Elaborate on electronic waste disposal procedures.

### 5.4.1. Waste Management and Methods of Waste Disposal -

The collection, disposal, monitoring, and processing of waste materials is known as waste management. These wastes affect living beings' health and the environment. For reducing their effects, they have to be managed properly. The waste is usually in solid, liquid or gaseous form.

The importance of waste management is:

Waste management is important because it decreases waste's impact on the environment, health, and other factors. It can also assist in the reuse or recycling of resources like paper, cans, and glass. The disposal of solid, liquid, gaseous, or dangerous substances is the example of waste management.

When it comes to trash management, there are numerous factors to consider, including waste disposal, recycling, waste avoidance and reduction, and garbage transportation. Treatment of solid and liquid wastes is part of the waste management process. It also provides a number of recycling options for goods that aren't classified as garbage during the process.

### 5.4.2 Methods of Waste Management

Non-biodegradable and toxic wastes, such as radioactive remains, can cause irreversible damage to the environment and human health if they are not properly disposed of. Waste disposal has long been a source of worry, with population increase and industrialisation being the primary causes. Here are a few garbage disposal options.

- **1. Landfills:** The most common way of trash disposal today is to throw daily waste/garbage into landfills. This garbage disposal method relies on burying the material in the ground.
- 2. Recycling: Recycling is the process of transforming waste items into new products in order to reduce energy consumption and the use of fresh raw materials. Recycling reduces energy consumption, landfill volume, air and water pollution, greenhouse gas emissions, and the preservation of natural resources for future use.

- **3. Composting:** Composting is a simple and natural bio-degradation process that converts organic wastes, such as plant remnants, garden garbage, and kitchen waste, into nutrient-rich food for plants.
- **4. Incineration:** Incineration is the process of combusting garbage. The waste material is cooked to extremely high temperatures and turned into materials such as heat, gas, steam, and ash using this technology.

### 5.4.3 Recyclable, Non-Recyclable and Hazardous Waste

- 1. Recyclable Waste: The waste which can be reused or recycled further is known as recyclable waste.
- **2. Non-recyclable Waste:** The waste which cannot be reused or recycled is known as non-recyclable waste. Polythene bags are a great example of non-recyclable waste.
- **3.** Hazardous Waste: The waste which can create serious harm to the people and the environment is known as hazardous waste.

### 5.4.4 Sources of Pollution -

Pollution is defined as the harm caused by the presence of a material or substances in places where they would not normally be found or at levels greater than normal. Polluting substances might be in the form of a solid, a liquid, or a gas.

• **Point source of pollution:** Pollution from a point source enters a water body at a precise location and can usually be identified. Effluent discharges from sewage treatment plants and industrial sites, power plants, landfill sites, fish farms, and oil leakage via a pipeline from industrial sites are all potential point sources of contamination.

Point source pollution is often easy to prevent since it is feasible to identify where it originates, and once identified, individuals responsible for the pollution can take rapid corrective action or invest in longer-term treatment and control facilities.

Diffuse source of pollution: As a result of land-use activities such as urban development, amenity, farming, and forestry, diffuse pollution occurs when pollutants are widely used and diffused over a large region. These activities could have occurred recently or in the past. It might be difficult to pinpoint specific sources of pollution and, as a result, take rapid action to prevent it because prevention often necessitates significant changes in land use and management methods.

#### **Pollution Prevention**

Pollution prevention entails acting at the source of pollutants to prevent or minimise their production. It saves natural resources, like water, by using materials and energy more efficiently.

#### Pollution prevention includes any practice that:

- Reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal;
- Reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants (these practices are known as "source reduction");
- Improved efficiency in the use of raw materials, energy, water, or other resources, or Conservation is a method of safeguarding natural resources.
- Improvements in housekeeping, maintenance, training, or inventory management; equipment or technology adjustments; process or method modifications; product reformulation or redesign; raw material substitution; or improvements in housekeeping, maintenance, training, or inventory control.

### 5.4.5 Electronic Waste

Lead, cadmium, beryllium, mercury, and brominated flame retardants are found in every piece of electronic waste. When gadgets and devices are disposed of illegally, these hazardous compounds are more likely to contaminate the earth, pollute the air, and leak into water bodies.

When e-waste is dumped in a landfill, it tends to leach trace metals as water runs through it. The contaminated landfill water then reaches natural groundwater with elevated toxic levels, which can be dangerous if it reaches any drinking water bodies. Despite having an environmentally benign approach, recycling generally results in international shipment and dumping of the gadgets in pits.

#### Some eco-friendly ways of disposing of e-waste are:

- · Giving back the e-waste to the electronic companies and drop-off points
- · Following guidelines issued by the government
- Selling or donating the outdated technology-based equipment
- · Giving e-waste to a certified e-waste recycler

## Exercise 📝

- 1. Name all five types of fire extinguishers.
- 2. Explain PPE in brief.
- 3. List the common workplace hazards.
- 4. Fill in the blacks:
  - i. A "\_\_\_\_\_\_ sign" is a safety sign that prohibits behaviour that is likely to endanger one's health or safety.
  - ii. \_\_\_\_\_\_ entails acting at the source of pollutants to prevent or minimise their production.
  - iii. \_\_\_\_\_\_ is the treatment or care given to someone who has sustained an injury or disease until more advanced care can be obtained or the person recovers.
  - iv. The threats caused by biological agents like viruses, bacteria, animals, plants, insects and also humans, are known as \_\_\_\_\_\_.
  - v. The workplace has to be administered as per the rules of the \_\_\_\_\_\_.

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6. Employability & **Entrepreneurship Skills** 

- Unit 6.1 Personal Strengths & Value Systems
- Unit 6.2 Digital Literacy: A Recap
- Unit 6.3 Money Matters
- Unit 6.4 Preparing for Employment & Self Employment
- Unit 6.5 Understanding Entrepreneurship
- Unit 6.6 Preparing to be an Entrepreneur



# Key Learning Outcomes

#### At the end of this module, you will be able to:

- 1. Explain the meaning of health
- 2. List common health issues
- 3. Discuss tips to prevent common health issues
- 4. Explain the meaning of hygiene
- 5. Discuss the purpose of Swacch Bharat Abhiyan
- 6. Explain the meaning of habit
- 7. Discuss ways to set up a safe work environment
- 8. Discuss critical safety habits to be followed by employees
- 9. Explain the importance of self-analysis
- 10. Discuss motivation with the help of Maslow's Hierarchy of Needs
- 11. Discuss the meaning of achievement motivation
- 12. List the characteristics of entrepreneurs with achievement motivation
- 13. List the different factors that motivate you
- 14. Discuss the role of attitude in self-analysis
- 15. Discuss how to maintain a positive attitude
- 16. List your strengths and weaknesses
- 17. Discuss the qualities of honest people
- 18. Describe the importance of honesty in entrepreneurs
- 19. Discuss the elements of a strong work ethic
- 20. Discuss how to foster a good work ethic
- 21. List the characteristics of highly creative people
- 22. List the characteristics of highly innovative people
- 23. Discuss the benefits of time management
- 24. List the traits of effective time managers
- 25. Describe effective time management technique
- 26. Discuss the importance of anger management
- 27. Describe anger management strategies
- 28. Discuss tips for anger management
- 29. Discuss the causes of stress
- 30. Discuss the symptoms of stress
- 31. Discuss tips for stress management
- 32. Identify the basic parts of a computer
- 33. Identify the basic parts of a keyboard
- 34. Recall basic computer terminology
- 35. Recall the functions of basic computer keys
- 36. Discuss the main applications of MS Office
- 37. Discuss the benefits of Microsoft Outlook
- 38. Discuss the different types of e-commerce
- 39. List the benefits of e-commerce for retailers and customers
- 40. Discuss how the Digital India campaign will help boost e-commerce in India
- 41. Describe how you will sell a product or service on an e-commerce platform
- 42. Discuss the importance of saving money

- 43. Discuss the benefits of saving money
- 44. Discuss the main types of bank accounts
- 45. Describe the process of opening a bank account
- 46. Differentiate between fixed and variable costs
- 47. Describe the main types of investment options
- 48. Describe the different types of insurance products
- 49. Describe the different types of taxes
- 50. Discuss the uses of online banking
- 51. Discuss the main types of electronic funds transfers
- 52. Discuss the steps to prepare for an interview
- 53. Discuss the steps to create an effective Resume
- 54. Discuss the most frequently asked interview questions
- 55. Discuss how to answer the most frequently asked interview questions
- 56. Discuss basic workplace terminology
- 57. Discuss the concept of entrepreneurship
- 58. Discuss the importance of entrepreneurship
- 59. Describe the characteristics of an entrepreneur
- 60. Describe the different types of enterprises
- 61. List the qualities of an effective leader
- 62. Discuss the benefits of effective leadership
- 63. List the traits of an effective team
- 64. Discuss the importance of listening effectively
- 65. Discuss how to listen effectively
- 66. Discuss the importance of speaking effectively
- 67. Discuss how to speak effectively
- 68. Discuss how to solve problems
- 69. List important problem solving traits
- 70. Discuss ways to assess problem solving skills
- 71. Discuss the importance of negotiation
- 72. Discuss how to negotiate
- 73. Discuss how to identify new business opportunities
- 74. Discuss how to identify business opportunities within your business
- 75. Explain the meaning of entrepreneur
- 76. Describe the different types of entrepreneurs
- 77. List the characteristics of entrepreneurs
- 78. Recall entrepreneur success stories
- 79. Discuss the entrepreneurial process
- 80. Describe the entrepreneurship ecosystem
- 81. Discuss the purpose of the Make in India campaign
- 82. Discuss key schemes to promote entrepreneurs
- 83. Discuss the relationship between entrepreneurship and risk appetite
- 84. Discuss the relationship between entrepreneurship and resilience
- 85. Describe the characteristics of a resilient entrepreneur
- 86. Discuss how to deal with failure
- 87. Discuss how market research is carried out

- 88. Describe the 4 Ps of marketing
- 89. Discuss the importance of idea generation
- 90. Recall basic business terminology
- 91. Discuss the need for CRM
- 92. Discuss the benefits of CRM
- 93. Discuss the need for networking
- 94. Discuss the benefits of networking
- 95. Discuss the importance of setting goals
- 96. Differentiate between short-term, medium-term and long-term goals
- 97. Discuss how to write a business plan
- 98. Explain the financial planning process
- 99. Discuss ways to manage your risk
- 100. Describe the procedure and formalities for applying for bank finance
- 101. Discuss how to manage your own enterprise
- 102. List important questions that every entrepreneur should ask before starting an enterprise

### **UNIT 6.1: Personal Strengths & Value Systems**

## Unit Objectives

#### At the end of this unit, participant will be able to:

- 1. Explain the meaning of health
- 2. List common health issues
- 3. Discuss tips to prevent common health issues
- 4. Explain the meaning of hygiene
- 5. Discuss the purpose of Swacch Bharat Abhiyan
- 6. Explain the meaning of habit
- 7. Discuss ways to set up a safe work environment
- 8. Discuss critical safety habits to be followed by employees
- 9. Explain the importance of self-analysis
- 10. Discuss motivation with the help of Maslow's Hierarchy of Needs
- 11. Discuss the meaning of achievement motivation
- 12. List the characteristics of entrepreneurs with achievement motivation
- 13. List the different factors that motivate you
- 14. Discuss the role of attitude in self-analysis
- 15. Discuss how to maintain a positive attitude
- 16. List your strengths and weaknesses
- 17. Discuss the qualities of honest people
- 18. Describe the importance of honesty in entrepreneurs
- 19. Discuss the elements of a strong work ethic
- 20. Discuss how to foster a good work ethic
- 21. List the characteristics of highly creative people
- 22. List the characteristics of highly innovative people
- 23. Discuss the benefits of time management
- 24. List the traits of effective time managers
- 25. Describe effective time management technique
- 26. Discuss the importance of anger management
- 27. Describe anger management strategies
- 28. Discuss tips for anger management
- 29. Discuss the causes of stress
- 30. Discuss the symptoms of stress
- 31. Discuss tips for stress management

### 6.1.1 Health, Habits, Hygiene: What is Health?

As per the World Health Organization (WHO), health is a "State of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity." This means being healthy does not simply mean not being unhealthy – it also means you need

to be at peace emotionally, and feel fit physically. For example, you cannot say you are healthy simply because you do not have any physical ailments like a cold or cough. You also need to think about whether you are feeling calm, relaxed and happy.

#### **Common Health Issues**

Some common health issues are:

- Allergies
- Asthma
- Skin Disorders
- Depression and Anxiety
- Diabetes
- Cough, Cold, Sore Throat
- Difficulty Sleeping
- Obesity

#### **Prevent Health Issues**

Taking measures to prevent ill health is always better than curing a disease or sickness. You can stay healthy by:

- Eating healthy foods like fruits, vegetables and nuts
- Cutting back on unhealthy and sugary foods
- Drinking enough water everyday
- Not smoking or drinking alcohol
- Exercising for at least 30 minutes a day, 4-5 times a week
- Taking vaccinations when required
- Practicing yoga exercises and meditation

## How many of these health standards do you follow? Tick the ones that apply to you.

1.	Get minimum 7-8 hours of sleep every night.	
2.	Avoid checking email first thing in the morning and right before you go to bed at night.	
3.	Don't skip meals – eat regular meals at correct meal times.	
4.	Read a little bit every single day.	
5.	Eat more home cooked food than junk food.	
6.	Stand more than you sit.	
7.	Drink a glass of water first thing in the morning and have at least 8 glasses of water through the day.	

8. Go to the doctor and dentist for regular check-ups.		
9. Exercise for 30 minutes at least 5 days a week.		
10. Avoid consuming lots of aerated beverages.		
What is Hygiene?		
As per the World Health Organization (WHO), "Hygiene refers to conditions and practices that help to maintain health and prevent the spread of diseases." In other words, hygiene means ensuring that you do whatever is required to keep your surroundings clean, so that you reduce the chances of spreading germs and diseases.		
For instance, think about the kitchen in your home. Good hygiene means ensuring that the kitchen is always spick and span, the food is put away, dishes are washed and dustbins are not overflowing with garbage. Doing all this will reduce the chances of attracting pests like rats or cockroaches, and prevent the growth of fungus and other bacteria, which could spread disease.		
How many of these health standards do you follow? Tick the ones that apply to		
you.		
1. Have a bath or shower every day with soap – and wash your hair with shampoo 2-3 times a week.		
2. Wear a fresh pair of clean undergarments every day.		
3. Brush your teeth in the morning and before going to bed.		
4. Cut your fingernails and toenails regularly.		
5. Wash your hands with soap after going to the toilet.		
6. Use an anti-perspirant deodorant on your underarms if you sweat a lot.		
7. Wash your hands with soap before cooking or eating.		
8. Stay home when you are sick, so other people don't catch what you have.		
9. Wash dirty clothes with laundry soap before wearing them again.		
10. Cover your nose with a tissue/your hand when coughing or sneezing.		
See how healthy and hygienic you are, by giving yourself 1 point for every ticke Then take a look at what your score means.	d statement!	

### Your Score

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**0-7/20**: You need to work a lot harder to stay fit and fine! Make it a point to practice good habits daily and see how much better you feel!

**7-14/20**: Not bad, but there is scope for improvement! Try and add a few more good habits to your daily routine.

14-20/20: Great job! Keep up the good work! Your body and mind thank you!

We have already discussed the importance of following good hygiene and health practices for ourselves. But, it is not enough for us to be healthy and hygienic. We must also extend this standard to our homes, our immediate surroundings and to our country as a whole.

#### Swachh Bharat Abhiyan

The 'Swachh Bharat Abhiyan' (Clean India Mission) launched by Prime Minister Shri Narendra Modi on 2<sup>nd</sup> October 2014, believes in doing exactly this. The aim of this mission is to clean the streets and roads of India and raise the overall level of cleanliness. Currently this mission covers 4,041 cities and towns across the country. Millions of our people have taken the pledge for a clean India. You should take the pledge too, and do everything possible to keep our country clean!

#### What are Habits?

A habit is a behaviour that is repeated frequently. All of us have good habits and bad habits. Keep in mind the phrase by John Dryden: "We first make our habits, and then our habits make us." This is why it is so important that you make good habits a way of life, and consciously avoid practicing bad habits.

Some good habits that you should make part of your daily routine are:

- Always having a positive attitude
- Smiling! Make it a habit to smile as often as possible
- Making exercise a part of your daily routine
- Reading motivational and inspirational stories
- Making time for family and friendsGoing to bed early and waking up early

Some bad habits that you should quit immediately are:

- Skipping breakfast
- Snacking frequently even when you are not hungry
- Eating too much fattening and sugary food
- Smoking, drinking alcohol and doing drugs
- Spending more money than you can afford
- Worrying about unimportant issues
- Staying up late and waking up late

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- Following healthy and hygienic practices every day will make you feel good mentally and physically.
- Hygiene is two-thirds of health so good hygiene will help you stay strong and healthy.

### 6.1.2: Safety: Tips to Design a Safe Workplace

Every employer is obligated to ensure that his workplace follows the highest possible safety protocol. When setting up a business, owners must make it a point to:

- Use ergonomically designed furniture and equipment to avoid stooping and twisting
- Provide mechanical aids to avoid lifting or carrying heavy objects
- Have protective equipment on hand for hazardous jobs
- Designate emergency exits and ensure they are easily accessible
- Set down health codes and ensure they are implemented
- Follow the practice of regular safety inspections in and around the workplace
- Ensure regular building inspections are conducted
- Get expert advice on workplace safety and follow it

#### Non-Negotiable Employee Safety Habits

Every employer is obligated to ensure that his workplace follows the highest possible safety protocol. When setting up a business, owners must make it a point to:

- Immediately report unsafe conditions to a supervisor
- Recognize and report safety hazards that could lead to slips, trips and falls
- Report all injuries and accidents to a supervisor
- Wear the correct protective equipment when required
- Learn how to correctly use equipment provided for safety purposes
- Be aware of and avoid actions that could endanger other people
- Take rest breaks during the day and some time off from work during the week

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- Be aware of what emergency number to call at the time of a workplace emergency
- Practice evacuation drills regularly to avoid chaotic evacuations

### 6.1.3 Self-Analysis – Attitude, Achievement Motivation

To truly achieve your full potential, you need to take a deep look inside yourself and find out what kind of person you really are. This attempt to understand your personality is known as self-analysis. Assessing yourself in this manner will help you grow, and will also help you to identify areas within yourself that need to be further developed, changed or eliminated. You can better understand yourself by taking a deep look at what motivates you, what your attitude is like, and what your strengths and weaknesses are.

#### What is Motivation?

Very simply put, motivation is your reason for acting or behaving in a certain manner. It is important to understand that not everyone is motivated by the same desires – people are motivated by many, many different things. We can understand this better by looking at Maslow's Hierarchy of Needs.

#### Maslow's Hierarchy of Needs

Famous American psychologist Abraham Maslow wanted to understand what motivates people. He believed that people have five types of needs, ranging from very basic needs (called physiological needs) to more important needs that are required for self-growth (called self-actualization needs). Between the physiological and self-actualization needs are three other needs – safety needs, belongingness and love needs, and esteem needs. Theseneeds are usually shown as a pyramid with five levels and are known as Maslow's Hierarchy of Needs.



#### Fig 6.1.1: Maslow's Hierarchy of Needs

As you can see from the pyramid, the lowest level depicts the most basic needs. Maslow believed that our behaviour is motivated by our basic needs, until those needs are met. Once they are fulfilled, we move to the next level and are motived by the next level of needs. Let's understand this better with an example.

Rupa comes from a very poor family. She never has enough food, water, warmth or rest. According to Maslow, until Rupa is sure that she will get these basic needs, she will not even think about the next level of needs – her safety needs. But, once Rupa is confident that her basic needs will be met, she will move to the next level, and her behaviour will then be motivated by her need for security and safety. Once these new needs are met, Rupa will once again move to the next level, and be motivated by her need for relationships and friends. Once this need is satisfied, Rupa will then focus on the fourth level of needs – her esteem needs, after which she will move up to the fifth and last level of needs – the desire to achieve her full potential.

#### **Understanding Achievement Motivation**

We now know that people are motivated by basic, psychological and self-fulfilment needs. However, certain people are also motivated by the achievement of highly challenging accomplishments. This is known as Achievement Motivation, or 'need for achievement'. The level of motivation achievement in a person differs from individual to individual. It is important that entrepreneurs have a high level of achievement motivation – a deep desire to accomplish something important and unique. It is equally important that they hire people who are also highly motivated by challenges and success.

#### What Motivates You?

What are the things that really motivate you? List down five things that really motivate you. Remember to answer honestly!

#### I am motivated by:

#### **Characteristics of Entrepreneurs with Achievement Motivation**

Entrepreneurs with achievement motivation can be described as follows:

- Unafraid to take risks for personal accomplishment
- Love being challenged
- Future-oriented
- Flexible and adaptive
- Value negative feedback more than positive feedback

### Very persistent when it comes to achieving goals

- Extremely courageous
- Highly creative and innovative
- Restless constantly looking to achieve more
- Feel personally responsible for solving problems

#### Think about it:

- How many of these traits do you have?
- Can you think of entrepreneurs who display these traits?

#### What is Attitude?

Now that we understand why motivation is so important for self-analysis, let's look at the role our attitude plays in better understanding ourselves. Attitude can be described as your tendency (positive or negative), to think and feel about someone or something. Attitude is the foundation for success in every aspect of life. Our attitude can be our best friend or our worst enemy. In other words:

Now that we understand why motivation is so important for self-analysis, let's look at the role our attitude plays in better understanding ourselves. Attitude can be described as your

tendency (positive or negative), to think and feel about someone or something. Attitude is the foundation for success in every aspect of life. Our attitude can be our best friend or our worst enemy. In other words:

#### "The only disability in life is a bad attitude."

When you start a business, you are sure to encounter a wide variety of emotions, from difficult times and failures to good times and successes. Your attitude is what will see you through the tough times and guide you towards success. Attitude is also infectious. It affects everyone around you, from your customers to your employees to your investors. A positive attitude helps build confidence in the workplace while a negative attitude is likely to result in the demotivation of your people.

#### How to Cultivate a Positive Attitude?

The good news is attitude is a choice. So, it is possible to improve, control and change our attitude, if we decide we want to!

The following tips help foster a positive mindset:

- Remember that you control your attitude, not the other way around
- Devote at least 15 minutes a day towards reading, watching or listening to something positive
- Avoid negative people who only complain and stop complaining yourself
- Expand your vocabulary with positive words and delete negative phrases from your mind
- Be appreciative and focus on what's good in yourself, in your life, and in others
- Stop thinking of yourself as a victim and start being proactive
- Imagine yourself succeeding and achieving your goals

#### What Are Your Strengths and Weaknesses?

Another way to analyse yourself is by honestly identifying your strengths and weaknesses. This will help you use your strengths to your best advantage and reduce your weaknesses.

Note down all your strengths and weaknesses in the two columns below. Remember to be honest with yourself!

Strengths	Weaknesses	

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- Achievement motivation can be learned.
- Don't be afraid to make mistakes.
- Train yourself to finish what you start.
- Dream big.

### 6.1.4 Honesty & Work Ethics: What is Honesty?

Honesty is the quality of being fair and truthful. It means speaking and acting in a manner that inspires trust. A person who is described as honest is seen as truthful and sincere, and as someone who isn't deceitful or devious and doesn't steal or cheat. There are two dimensions of honesty – one is honesty in communication and the other is honesty in conduct.

Honesty is an extremely important trait because it results in peace of mind and builds relationships that are based on trust. Being dishonest, on the other hand, results in anxiety and leads to relationships full of distrust and conflict.

#### **Qualities of Honest People**

Honest individuals have certain distinct characteristics. Some common qualities among honest people are:

- 1. They don't worry about what others think of them. They believe in being themselves they don't bother about whether they are liked or disliked for their personalities.
- 2. They stand up for their beliefs. They won't think twice about giving their honest opinion, even if they are aware that their point of view lies with the minority.
- 3. They are think skinned. This means they are not affected by others judging them harshly for their honest opinions.
- 4. They forge trusting, meaningful and healthy friendships. Honest people usually surround themselves with honest friends. They have faith that their friends will be truthful and upfront with them at all times.
- 5. They are trusted by their peers. They are seen as people who can be counted on for truthful and objective feedback and advice.

#### Importance of Honesty in Entrepreneurs

One of the most important characteristics of entrepreneurs is honesty. When entrepreneurs are honest with their customers, employees and investors, it shows that they respect those that they work with. It is also important that entrepreneurs remain honest with themselves.

Let's look at how being honest would lead to great benefits for entrepreneurs.

- Honesty and customers: When entrepreneurs are honest with their customers it leads to stronger relationships, which in turn results in business growth and a stronger customer network.
- **Honesty and employees:** When entrepreneurs build honest relationships with their employees, it leads to more transparency in the workplace, which results in higher work performance and better results.

- Honesty and investors: For entrepreneurs, being honest with investors means not only sharing strengths but also candidly disclosing current and potential weaknesses, problem areas and solution strategies. Keep in mind that investors have a lot of experience with start-ups and are aware that all new companies have problems. Claiming that everything is perfectly fine and running smoothly is a red flag for most investors.
- Honesty with oneself: The consequences of being dishonest with oneself can lead to dire results, especially in the case of entrepreneurs. For entrepreneurs to succeed, it is critical that they remain realistic about their situation at all times, and accurately judge every aspect of their enterprise for what it truly is.

#### What are Work Ethics?

Being ethical in the workplace means displaying values like honesty, integrity and respect in all your decisions and communications. It means not displaying negative qualities like lying, eating and stealing.

Workplace ethics play a big role in the profitability of a company. It is as crucial to an enterprise as high morale and teamwork. This is why most companies lay down specific workplace ethic guidelines that must compulsorily be followed by their employees.

These guidelines are typically outlined in a company's employee handbook.

#### **Elements of a Strong Work Ethic**

An entrepreneur must display strong work ethics, as well as hire only those individuals who believe in and display the same level of ethical behaviour in the workplace. Some elements of a strong work ethic are:

- **Professionalism**: This involves everything from how you present yourself in a corporate setting to the manner in which you treat others in the workplace.
- **Respectfulness**: This means remaining poised and diplomatic regardless of how stressful or volatile a situation is.
- **Dependability**: This means always keeping your word, whether it's arriving on time for a meeting or delivering work on time.
- **Dedication**: This means refusing to quit until the designated work is done, and completing the work at the highest possible level of excellence.
- **Determination**: This means embracing obstacles as challenges rather than letting them stop you, and pushing ahead with purpose and resilience to get the desired results.
- Accountability: This means taking responsibility for your actions and the consequences of your actions, and not making excuses for your mistakes.
- **Humility**: This means acknowledging everyone's efforts and had work, and sharing the credit for accomplishments.

#### How to Foster a Good Work Ethic?

As an entrepreneur, it is important that you clearly define the kind of behaviour that you expect from each and every team member in the workplace. You should make it clear that you expect employees to display positive work ethics like:

- **Honesty**: All work assigned to a person should be done with complete honesty, without any deceit or lies.
- Good attitude: All team members should be optimistic, energetic, and positive.
- **Reliability**: Employees should show up where they are supposed to be, when they are supposed to be there.
- **Good work habits**: Employees should always be well groomed, never use inappropriate language, conduct themselves professionally at all times and so on.
- Initiative: Doing the bare minimum is not enough. Every team member needs to be proactive and show initiative.
- **Trustworthiness**: Trust is non-negotiable. If an employee cannot be trusted, it's time to let that employee go.
- **Respect**: Employees need to respect the company, the law, their work, their colleagues and themselves.
- Integrity: Each and every team member should be completely ethical and must display above board behaviour at all times.
- **Efficiency**: Efficient employees help a company grow while inefficient employees result in a waste of time and resources.

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- Don't get angry when someone tells you the truth and you don't like what you hear.
- Always be willing to accept responsibility for your mistakes.

### 6.1.5 Creativity & Innovation: What is Creativity?

Creativity means thinking outside the box. It means viewing things in new ways or from different perspectives, and then converting these ideas into reality. Creativity involves two parts: thinking and producing. Simply having an idea makes you imaginative, not creative. However, having an idea and acting on it makes you creative.

#### **Characteristics of Highly Creative People**

Some characteristics of creative people are:

- They are imaginative and playful
- They see issues from different angles
- They detest rules and routineThey love to daydream
- They see issues norm unreferre un
- They are very curious
- They notice small details
- They have very little tolerance for boredom

#### What is Innovation?

There are many different definitions of innovation. In simple terms, innovation means turning an idea into a solution that adds value. It can also mean adding value by implementing a new

product, service or process, or significantly improving on an existing product, service or process.

#### **Characteristics of Highly Innovative People**

Some characteristics of highly innovative people are:

- They embrace doing things differently
- They don't believe in taking shortcuts
- They are highly proactive and persistent
- They are organized, cautious and riskaverse
- They are not afraid to be unconventional
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  - Take regular breaks from your creative work to recharge yourself and gain fresh perspective.
  - Build prototypes frequently, test them out, get feedback, and make the required changes.

### 6.1.6 Time Management: What is Time Management?

Time management is the process organizing your time, and deciding how to allocate your time between different activities. Good time management is the difference between working smart (getting more done in less time) and working hard (working for more time to get more done).

Effective time management leads to an efficient work output, even when you are faced with tight deadlines and high pressure situations. On the other hand, not managing your time effectively results in inefficient output and increases stress and anxiety.

#### **Benefits of Time Management**

Time management can lead to huge benefits like:

• Greater productivity

- Higher efficiency
- Better professional reputation
- Reduced stress
- Higher chances for career advancement

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Not managing time effectively can result in undesirable consequences like:

- Missing deadlines
- Substandard work quality
- Stalled career

- Inefficient work output
- Poor professional reputation

Greater opportunities to achieve goals

• Increase in stress and anxiety

#### **Traits of Effective Time Managers**

Some traits of effective time managers are:

- They begin projects early
- They set daily objectives
- They modify plans if required, to achieve better results
- They are flexible and open-minded
- They inform people in advance if their help will be required
- They know how to say no

#### **Effective Time Management Techniques**

- They break tasks into steps with specific deadlines
- They continually review long term goals
- They think of alternate solutions if and when required
- They ask for help when required
- They create backup plans

You can manage your time better by putting into practice certain time management techniques. Some helpful tips are:

- Plan out your day as well as plan for interruptions. Give yourself at least 30 minutes to figure out your time plan. In your plan, schedule some time for interruptions.
- Put up a "Do Not Disturb" sign when you absolutely have to complete a certain amount of work.
- Close your mind to all distractions. Train yourself to ignore ringing phones, don't reply to chat messages and disconnect from social media sites.
- Delegate your work. This will not only help your work get done faster, but will also show you the unique skills and abilities of those around you.
- Stop procrastinating. Remind yourself that procrastination typically arises due to the fear of failure or the belief that you cannot do things as perfectly as you wish to do them.
- Prioritize. List each task to be completed in order of its urgency or importance level. Then focus on completing each task, one by one.
- Maintain a log of your work activities. Analyse the log to help you understand how efficient you are, and how much time is wasted every day.
- Create time management goals to reduce time wastage.

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- Always complete the most important tasks first.
- Get at least 7 8 hours of sleep every day.
- Start your day early.
- Don't waste too much time on small, unimportant details.
- Set a time limit for every task that you will undertake.
  - Give yourself some time to unwind between tasks.

### 6.1.7 Anger Management: What is Anger Management?

Anger management is the process of:

- 1. Learning to recognize the signs that you, or someone else, is becoming angry
- 2. Taking the best course of action to calm down the situation in a positive way

Anger management does not mean suppressing anger.

#### **Importance of Anger Management**

Anger is a perfectly normal human emotion. In fact, when managed the right way, anger can be considered a healthy emotion. However, if it is not kept in check, anger can make us act inappropriately and can lead to us saying or doing things that we will likely later regret. Extreme anger can:

- **Hurt you physically**: It leads to heart disease, diabetes, a weakened immune system, insomnia, and high blood pressure.
- **Hurt you mentally**: It can cloud your thinking and lead to stress, depression and mental health issues.
- **Hurt your career**: It can result in alienating your colleagues, bosses, clients and lead to the loss of respect.
- **Hurt your relationships**: It makes it hard for your family and friends to trust you, be honest with you and feel comfortable around you.

This is why anger management, or managing anger appropriately, is so important.

#### **Anger Management Strategies**

Here are some strategies that can help you control your anger:

#### **Strategy 1: Relaxation**

Something as simple as breathing deeply and looking at relaxing images works wonders in calming down angry feelings. Try this simple breathing exercise:

- 1. Take a deep breath from your diaphragm (don't breathe from your chest)
- 2. Visualize your breath coming up from your stomach
- 3. Keep repeating a calming word like 'relax' or 'take it easy' (remember to keep breathing
- 4. deeply while repeating the word)
- 5. Picture a relaxing moment (this can be from your memory or your imagination)
- 6. Follow this relaxation technique daily, especially when you realize that you're starting to feel angry.

#### Strategy 2: Cognitive Restructuring

Cognitive restructuring means changing the manner in which you think. Anger can make you curse, swear, exaggerate and act very dramatically. When this happens, force yourself to replace your angry thoughts with more logical ones. For instance, instead of thinking 'Everything is ruined' change your mindset and tell yourself 'It's not the end of the world and getting angry won't solve this'.

#### Strategy 3: Problem Solving

Getting angry about a problem that you cannot control is a perfectly natural response. Sometimes, try as you may, there may not be a solution to the difficulty you are faced with. In such cases, stop focusing on solving the problem, and instead focus on handling and facing the problem. Remind yourself that you will do your best to deal with the situation, but that you will not blame yourself if you don't get the solution you desire.

#### **Strategy 4: Better Communication**

When you're angry, it is very easy to jump to inaccurate conclusions. In this case, you need to force yourself to stop reacting, and think carefully about what you want to say, before saying it. Avoid saying the first thing that enters your head. Force yourself to listen carefully to what the other person is saying. Then think about the conversation before responding.

#### **Strategy 5: Changing Your Environment**

If you find that your environment is the cause of your anger, try and give yourself a break from your surroundings. Make an active decision to schedule some personal time for yourself, especially on days that are very hectic and stressful. Having even a brief amount of quiet or alone time is sure to help calm you down.

#### **Tips for Anger Management**

The following tips will help you keep your anger in check:

- Take some time to collect your thoughts before you speak out in anger.
- Express the reason for your anger in an assertive, but non-confrontational manner once you have calmed down.
- Do some form of physical exercise like running or walking briskly when you feel yourself getting angry.
- Make short breaks part of your daily routine, especially during days that are stressful.
- Focus on how to solve a problem that's making you angry, rather than focusing on the fact that the problem is making you angry.

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- Try to forgive those who anger you, rather than hold a grudge against them.
- Avoid using sarcasm and hurling insults. Instead, try and explain the reason for your frustration in a polite and mature manner.

### 6.1.8 Stress Management: What is Stress?

We say we are 'stressed' when we feel overloaded and unsure of our ability to deal with the pressures placed on us. Anything that challenges or threatens our well-being can be defined as a stress. It is important to note that stress can be good and bad. While good stress keeps us going, negative stress undermines our mental and physical health. This is why it is so important to manage negative stress effectively.

#### **Causes of Stress**

Stress can be caused by internal and external factors.

#### Internal causes of stress

- Constant worry
- Rigid thinking
- Unrealistic expectations

#### **External causes of stress**

- Major life changes
- Difficulties with relationships
- Having too much to do

- Pessimism
- Negative self-talk
- All in or all out attitude
- Difficulties at work or in school
- Financial difficulties
- Worrying about one's children and/or family

#### Symptoms of Stress

Stress can manifest itself in numerous ways. Take a look at the cognitive, emotional, physical and behavioural symptoms of stress.

Cognitive Symptoms	Emotional Symptoms
<ul> <li>Memory problems</li> <li>Concentration issues</li> <li>Lack of judgement</li> <li>Pessimism</li> <li>Anxiety</li> <li>Constant worrying</li> </ul>	<ul> <li>Depression</li> <li>Agitation</li> <li>Irritability</li> <li>Loneliness</li> <li>Anxiety</li> <li>Anger</li> </ul>
Fig 6.1.1 (a): Stress symptoms Physical Symptoms	Behavioural Symptoms
<ul> <li>Aches and pain</li> <li>Diarrhoea or constipation</li> <li>Nausea</li> <li>Dizziness</li> <li>Chest pain and/or rapid heartbeat</li> <li>Frequent cold or flu like feelings</li> </ul>	<ul> <li>Increase or decrease in appetite</li> <li>Over sleeping or not sleeping enough</li> <li>Withdrawing socially</li> <li>Ignoring responsibilities</li> <li>Consumption of alcohol or cigarettes</li> <li>Nervous habits like nail biting and pacing</li> </ul>

Fig 6.1.1 (b): Stress symptoms

#### **Tips to Manage Stress**

The following tips can help you manage your stress better:

- Note down the different ways in which you can handle the various sources of your stress.
- Remember that you cannot control everything, but you can control how you respond.
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- Practice relaxation techniques like meditation, yoga or tai chi when you start feeling stressed.
- Discuss your feelings, opinions and beliefs rather than reacting angrily, defensively or passively.
- Devote a part of your day towards exercise.
- Eat healthy foods like fruits and vegetables. Avoid unhealthy foods especially those containing large amounts of sugar.
- Plan your day so that you can manage your time better, with less stress.
- Say no to people and things when required.
- Schedule time to pursue your hobbies and interests.
- Ensure you get at least 7-8 hours of sleep.
- Reduce your caffeine intake.
- Increase the time spent with family and friends.

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- Force yourself to smile even if you feel stressed. Smiling makes us feel relaxed and happy.
- Stop yourself from feeling and thinking like a victim. Change your attitude and focus on being proactive.

## UNIT 6.2: Digital Literacy: A Recap

### Unit Objectives

#### At the end of this unit, you will be able to:

- 1. Identify the basic parts of a computer
- 2. Identify the basic parts of a keyboard
- 3. Recall basic computer terminology
- 4. Recall the functions of basic computer keys
- 5. Discuss the main applications of MS Office
- 6. Discuss the benefits of Microsoft Outlook
- 7. Discuss the different types of e-commerce
- 8. List the benefits of e-commerce for retailers and customers
- 9. Discuss how the Digital India campaign will help boost e-commerce in India

### 6.2.1 Computer and Internet basics: Basic Parts of a Computer



Fig.6.2.1. Parts of a Computer

- **Central Processing Unit (CPU)**: The brain of the computer. It interprets and carries out program instructions.
- Hard Drive: A device that stores large amounts of data.
- Monitor: The device that contains the computer screen where the information is visually displayed.
- **Mouse**: A hand-held device used to point to items on the monitor.
- **Speakers**: Devices that enable you to hear sound from the computer.
- Printer: A device that converts output from a computer into printed paper documents.
#### **Basic Parts of a Keyboard**



Shift Space Enter Arrow Keys

Fig.6.2.2. Parts of a Keyboard

- Arrow Keys: Press these keys to move your cursor.
- **Space bar**: Adds a space.
- Enter/Return: Moves your cursor to a new line.
- **Shift**: Press this key if you want to type a capital letter or the upper symbol of a key.
- **Caps Lock**: Press this key if you want all the letters you type to be capital letters. Press it again to revert back to typing lowercase letters.
- **Backspace**: Deletes everything to the left of your cursor.

#### **Basic Internet Terms**

- **The Internet:** A vast, international collection of computer networks that transfers information.
- The World Wide Web: A system that lets you access information on the Internet.
- Website: A location on the World Wide Web (and Internet) that contains information about a specific topic.
- **Homepage:** Provides information about a website and directs you to other pages on that website.
- Link/Hyperlink: A highlighted or underlined icon, graphic, or text that takes you to another file or object.
- Web Address/URL: The address for a website.
- Address Box: A box in the browser window where you can type in a web address.

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- When visiting a .com address, there no need to type http:// or even www. Just type the name of the website and then press Ctrl + Enter. (Example: Type 'apple' and press Ctrl + Enter to go to www.apple.com)
- Press the Ctrl key and press the + or to increase and decrease the size of text.
- Press F5 or Ctrl + R to refresh or reload a web page.

## 6.2.2 MS Office and Email: About MS Office

MS Office or Microsoft Office is a suite of computer programs developed by Microsoft. Although meant for all users, it offers different versions that cater specifically to students, home users and business users. All the programs are compatible with both, Windows and Macintosh.

#### **Most Popular Office Products**

Some of the most popular and universally used MS Office applications are:

- Microsoft Word: Allows users to type text and add images to a document.
- Microsoft Excel: Allows users to enter data into a spreadsheet and create calculations and graphs.
- Microsoft PowerPoint: Allows users to add text, pictures and media and create slideshows and presentations.
- Microsoft Outlook: Allows users to send and receive email.
- Microsoft OneNote: Allows users to make drawings and notes with the feel of a pen on paper.
- Microsoft Access: Allows users to store data over many tables.

#### Why Choose Microsoft Outlook?

A popular email management choice especially in the workplace, Microsoft Outlook also includes an address book, notebook, web browser and calendar. Some major benefits of this program are:

- Integrated search function: You can use keywords to search for data across all Outlook programs.
- Enhanced security: Your email is safe from hackers, junk mail and phishing website email.
- **Email syncing**: Sync your mail with your calendar, contact list, notes in One Note and...your phone!
- **Offline access to email:** No Internet? No problem! Write emails offline and send them when you're connected again.

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- Press Ctrl+R as a shortcut method to reply to email.
- Set your desktop notifications only for very important emails.
- Flag messages quickly by selecting messages and hitting the Insert key.
- Save frequently sent emails as a template to reuse again and again.
- Conveniently save important emails as files.

## 6.2.3 E-Commerce: What is E-Commerce?

E-commerce is the buying or selling of goods and services, or the transmitting of money or data, electronically on the internet. E-Commerce is the short form for "electronic commerce."

#### **Examples of E-Commerce**

Some examples of e-commerce are:

Online shopping

Electronic payments

Online auctions

Internet banking

• Online ticketing

#### **Types of E-Commerce**

E-commerce can be classified based on the types of participants in the transaction. The main types of e-commerce are:

- Business to Business (B2B): Both the transacting parties are businesses.
- Business to Consumer (B2C): Businesses sell electronically to end-consumers.
- **Consumer to Consumer (C2C):** Consumers come together to buy, sell or trade items to other consumers.
- **Consumer-to-Business (C2B)**: Consumers make products or services available for purchase to companies looking for exactly those services or products.
- **Business-to-Administration (B2A)**: Online transactions conducted between companies and public administration.
- Consumer-to-Administration (C2A): Online transactions conducted between individual and public administration.

#### **Benefits of E-Commerce**

The e-commerce business provides some benefits for retailers and customers.

#### **Benefits for retailers**

- Establishes an online presence
- Reduces operational costs by removing overhead costs
- Increases brand awareness through the use of good keywords
- Increases sales by removing geographical and time constraints

#### **Benefits for customers**

- Offers a wider range of choice than any physical store
- Enables goods and services to be purchased from remote locations
- Enables consumers to perform price comparisons

#### **Digital India Campaign**

Prime Minister Narendra Modi launched the Digital India campaign in 2015, with the objective of offering every citizen of India access to digital services, knowledge and information. The campaign aims to improve the country's online infrastructure and increase internet connectivity, thus boosting the e-commerce industry.

Currently, the majority of online transactions come from tier 2 and tier 3 cities. Once the Digital India campaign is in place, the government will deliver services through mobile connectivity, which will help deliver internet to remote corners of the country. This will help the e-commerce market to enter India's tier 4 towns and rural areas.

#### **E-Commerce Activity**

Choose a product or service that you want to sell online. Write a brief note explaining how you will use existing e-commerce platforms, or create a new e-commerce platform, to sell your product or service.

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- Before launching your e-commerce platform, test everything.
- Pay close and personal attention to your social media.

# **UNIT 6.3: Money Matters**

# Unit Objectives

#### At the end of this unit, you will be able to:

- 1. Discuss the importance of saving money
- 2. Discuss the benefits of saving money
- 3. Discuss the main types of bank accounts
- 4. Describe the process of opening a bank account
- 5. Differentiate between fixed and variable costs
- 6. Describe the main types of investment options
- 7. Describe the different types of insurance products
- 8. Describe the different types of taxes
- 9. Discuss the uses of online banking
- 10. Discuss the main types of electronic funds transfers

### 6.3.1 Personal Finance – Why to Save? Importance of Saving

We all know that the future is unpredictable. You never know what will happen tomorrow, next week or next year. That's why saving money steadily through the years is so important. Saving money will help improve your financial situation over time. But more importantly, knowing that you have money stashed away for an emergency will give you peace of mind. Saving money also opens the door to many more options and possibilities.

#### **Benefits of Saving**

Inculcating the habit of saving leads to a vast number of benefits. Saving helps you:

- Become financially independent: When you have enough money saved up to feel secure you can start making your choices, from taking a vacation whenever you want, to switching careers or starting your own business.
- Invest in yourself through education: Through saving, you can earn enough to pay up for courses that will add to your professional experience and ultimately result in higher paying jobs.
- **Get out of debt**: Once you have saved enough as a reserve fund, you can use your savings to pay off debts like loans or bills that have accumulated over time.
- Be prepared for surprise expenses: Having money saved enables you to pay for unforeseen expenses like sudden car or house repairs, without feeling financially stressed.
- **Pay for emergencies**: Saving helps you deal with emergencies like sudden health issues or emergency trips without feeling financially burdened.
- Afford large purchases and achieve major goals: Saving diligently makes it possible to place down payments towards major purchases and goals, like buying a home or a car.
- **Retire**: The money you have saved over the years will keep you comfortable when you no longer have the income you would get from your job.

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- Break your spending habit. Try not spending on one expensive item per week, and put the money that you would have spent into your savings.
- Decide that you will not buy anything on certain days or weeks and stick to your word.

### 6.3.2 Types of Bank Accounts, Opening a Bank Account

#### **Types of Bank Accounts**

In India, banks offer four main types of bank accounts. These are:

- Current Accounts
- Savings Accounts
- Recurring Deposit Accounts
- Fixed Deposit Accounts

#### **Current Accounts**

Current accounts offer the most liquid deposits and thus, are best suited for businessmen and companies. As these accounts are not meant for investments and savings, there is no imposed limit on the number or amount of transactions that can be made on any given day. Current account holders are not paid any interest on the amounts held in their accounts. They are charged for certain services offered on such accounts.

#### **Saving Accounts**

Savings accounts are meant to promote savings, and are therefore the number one choice for salaried individuals, pensioners and students. While there is no restriction on the number and amount of deposits made, there are usually restrictions on the number and amount of withdrawals. Savings account holders are paid interest on their savings.

#### **Recurring Deposit Accounts**

Recurring Deposit accounts, also called RD accounts, are the accounts of choice for those who want to save an amount every month, but are unable to invest a large sum at one time. Such account holders deposit a small, fixed amount every month for a pre-determined period (minimum 6 months). Defaulting on a monthly payment results in the account holder being charged a penalty amount. The total amount is repaid with interest at the end of the specified period.

#### **Fixed Deposit Accounts**

Fixed Deposit accounts, also called FD accounts, are ideal for those who wish to deposit their savings for a long term in return for a high rate of interest. The rate of interest offered depends on the amount deposited and the time period, and also differs from bank to bank. In the case of an FD, a certain amount of money is deposited by the account holder for a fixed period of time. The money can be withdrawn when the period expires. If necessary, the depositor can break the fixed deposit prematurely. However, this usually attracts a penalty amount which also differs from bank to bank.

# Opening a Bank Account

Opening a bank account is quite a simple process. Take a look at the steps to open an account of your own:

#### Step 1: Fill in the Account Opening Form

This form requires you to provide the following information:

- Personal details (name, address, phone number, date of birth, gender, occupation, address)
- Method of receiving your account statement (hard copy/email)
- Details of your initial deposit (cash/cheque)
- Manner of operating your account (online/mobile banking/traditional via cheque, slip books)

Ensure that you sign wherever required on the form.

#### Step 2: Affix your Photograph

Stick a recent photograph of yourself in the allotted space on the form.

#### Step 3: Provide your Know Your Customer (KYC) Details

KYC is a process that helps banks verify the identity and address of their customers. To open an account, every individual need to submit certain approved documents with respect to photo identity (ID) and address proof. Some Officially Valid Documents (OVDs) are:

- Passport
- Driving License
- Voters' Identity Card
- PAN Card
- UIDAI (Aadhar) Card

#### Step 4: Submit All your Documents

Submit the completed Account Opening Form and KYC documents. Then wait until the forms are processed and your account has been opened!

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- Select the right type of account.
- Fill in complete nomination details.
- Understand the rules.
  - Check for online banking it's convenient!

• Ask about fees.

Keep an eye on your bank balance.

# 6.3.3 Costs: Fixed vs Variable: What are Fixed and Variable-Costs?

Fixed costs and variable costs together make up a company's total cost. These are the two types of costs that companies have to bear when producing goods and services. A fixed cost does not change with the volume of goods or services a company produces. It always remains the same.

A variable cost, on the other hand, increases and decreases depending on the volume of goods and services produced. In other words, it varies with the amount produced.

#### **Differences Between Fixed and Variable Costs**

Criteria	Fixed Costs	Variable Costs
Meaning	A cost that stays the same, regardless of the output produced.	A cost that changes when the
Nature	Time related.	Volume related.
Incurred	Incurred irrespective of units being produced.	Incurred only when units are produced
Unit cost	Inversely proportional to the number of units produced	Remains the same, per unit.
Examples	Depreciation, rent, salary, insurance and tax	Material consumed, wages, commission on sales and packing
		expenses

Let's take a look at some of the main differences between fixed and variable costs:

Fig 6.3.1: Variable and fixed costs

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 When trying to determine whether a cost is fixed or variable, simply ask the following question: Will the particular cost change if the company stopped its production activities? If the answer is no, then it is a fixed cost. If the answer is yes, then it is probably a variable cost.

## 6.3.4 Investment, Insurance and Taxes: Investment

Investment means that money is spent today with the aim of reaping financial gains at a future time. The main types of investment options are as follows:

• **Bonds:** Bonds are instruments used by public and private companies to raise large sums of money – too large to be borrowed from a bank. These bonds are then issued in the public market and are bought by lenders.

- **Stocks:** Stocks or equity are shares that are issued by companies and are bought by the general public.
- Small Savings Schemes: Small Savings Schemes are tools meant to save money in small amounts. Some popular schemes are the Employees Provident Fund, Sukanya Samriddhi Scheme and National Pension Scheme.
- **Mutual Funds:** Mutual Funds are professionally managed financial instruments that invest money in different securities on behalf of investors.
- **Fixed Deposits:** A fixed amount of money is kept aside with a financial institution for a fixed amount of time in return for interest on the money.
- **Real Estate:** Loans are taken from banks to purchase real estate, which is then leased or sold with the aim of making a profit on the appreciated property price.
- Hedge Funds: Hedge funds invest in both financial derivatives and/or publicly traded securities.
- **Private Equity:** Private Equity is trading in the shares of an operating company that is not publicly listed and whose shares are not available on the stock market.

#### Insurance

There are two types of insurance – Life Insurance and Non-Life or General Insurance.

#### Life Insurance

Life Insurance deals with all insurance covering human life.

#### **Life Insurance Products**

The main life insurance products are:

- **Term Insurance:** This is the simplest and cheapest form of insurance. It offers financial protection for a specified tenure, say 15 to 20 years. In the case of your death, your family is paid the sum assured. In the case of your surviving the term, the insurer pays nothing.
- Endowment Policy: This offers the dual benefit of insurance and investment. Part of the premium is allocated towards the sum assured, while the remaining premium gets invested in equity and debt. It pays a lump sum amount after the specified duration or on the death of the policyholder, whichever is earlier.
- Unit-Linked Insurance Plan (ULIP): Here part of the premium is spent on the life cover, while the remaining amount is invested in equity and debt. It helps develop a regular saving habit.
- Money Back Life Insurance: While the policyholder is alive, periodic payments of the partial survival benefits are made during the policy tenure. On the death of the insured, the insurance company pays the full sum assured along with survival benefits.
- Whole Life Insurance: It offers the dual benefit of insurance and investment. It offers insurance cover for the whole life of the person or up to 100 years whichever is earlier.

#### **General Insurance**

General Insurance deals with all insurance covering assets like animals, agricultural crops, goods, factories, cars and so on.

#### **General Insurance Products**

The main general insurance products are:

- Motor Insurance: This can be divided into Four-Wheeler Insurance and Two-Wheeler insurance.
- **Health Insurance:** The main types of health insurance are individual health insurance, family floater health insurance, comprehensive health insurance and critical illness insurance.
- **Travel Insurance:** This can be categorised into Individual Travel Policy, Family Travel Policy, Student Travel Insurance and Senior Citizen Health Insurance.
- Home Insurance: This protects the house and its contents from risk.
- Marine Insurance: This insurance covers goods, freight and cargo against loss or damage during transit by rail, road, sea and/or air.

#### Taxes

There are two types of taxes – Direct Taxes and Indirect Taxes.

#### **Direct Tax**

Direct taxes are levied directly on an entity or a person and are non-transferrable. Some examples of Direct Taxes are:

- **Income Tax:** This tax is levied on your earning in a financial year. It is applicable to both, individuals and companies.
- **Capital Gains Tax:** This tax is payable whenever you receive a sizable amount of money. It is usually of two types – short term capital gains from investments held for less than 36 months and long term capital gains from investments held for longer than 36 months.
- Securities Transaction Tax: This tax is added to the price of a share. It is levied every time you buy or sell shares.
- **Perquisite Tax:** This tax is levied is on perks that have been acquired by a company or used by an employee.
- **Corporate Tax:** Corporate tax is paid by companies from the revenue they earn.

#### **Indirect Tax**

Indirect taxes are levied on goods or services. Some examples of Indirect Taxes are:

- Sales Tax: Sales Tax is levied on the sale of a product.
- Service Tax: Service Tax is added to services provided in India.
- Value Added Tax: Value Added Tax is levied at the discretion of the state government. The tax is levied on goods sold in the state. The tax amount is decided by the state.
- **Customs Duty & Octroi:** Customs Duty is a charge that is applied on purchases that are imported from another country. Octroi is levied on goods that cross state borders within India.
- Excise Duty: Excise Duty is levied on all goods manufactured or produced in India

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- Think about how quickly you need your money back and pick an investment option accordingly.
- Ensure that you are buying the right type of insurance policy for yourself.
- Remember, not paying taxes can result in penalties ranging from fines to imprisonment.

# 6.3.5 Online Banking, NEFT, RTGS etc.: What is Online Banking?

Internet or online banking allows account holders to access their account from a laptop at any location. In this way, instructions can be issued. To access an account, account holders simply

Internet banking can be used to:

- Find out an account balance
- Transfer amounts from one account to another
- Arrange for the issuance of cheques
- Instruct payments to be made

#### **Electronic Funds Transfers**

Electronic funds transfer is a convenient way of transferring money from the comfort of one's own home, using integrated banking tools like internet and mobile banking. Transferring funds via an electronic gateway is extremely convenient. With the help of online banking, you can choose to:

- Transfer funds into your own accounts of the same bank.
- Transfer funds into different accounts of the same bank.
- Transfer funds into accounts in different bank, using NEFT.

#### NEFT

NEFT stands for National Electronic Funds Transfer. This money transfer system allows you to electronically transfer funds from your respective bank accounts to any other account, either in the same bank or belonging to any other bank. NEFT can be used by individuals, firms and corporate organizations to transfer funds between accounts.

In order to transfer funds via NEFT, two things are required:

- A transferring bank
- A destination bank

• Request for a cheque book

• Transfer funds into other bank

• Transfer funds into various

accounts using RTGS.

accounts using IMPS.

- Request for a statement of accounts
- Make a fixed deposit

Before you can transfer funds through NEFT, you will need to register the beneficiary who will be receiving the funds. In order to complete this registration, you will require the following information:

- Recipient's name
- Recipient's account number
- Recipient's bank's name
- Recipient's bank's IFSC code

RTGS

RTGS stands for Real Time Gross Settlement. This is a real-time fund transfer system which enables you to transfer funds from one bank to another, in real time or on a gross basis. The transferred amount is immediately deducted from the account of one bank, and instantly credited to the other bank's account. The RTGS payment gateway is maintained by the Reserve Bank of India. The transactions between banks are made electronically. RTGS can be used by individuals, companies and firms to transfer large sums of money. Before remitting funds through RTGS, you will need to add the beneficiary and his bank account details via your online banking account. In order to complete this registration, you will require the

Name of the beneficiary

Beneficiary's bank address

- Beneficiary's account number
- Beneficiary's bank's IFSC code

#### IMPS

IMPS stands for Immediate Payment Service. This is a real-time, inter-bank, electronic funds transfer system used to transfer money instantly within banks across India. IMPS enables users to make instant electronic transfer payments using mobile phones through both, Mobile Banking and SMS. It can also be used through ATMs and online banking. IMPS is available 24 hours a day and 7 days a week. The system features a secure transfer gateway and immediately confirms orders that have been fulfilled.

- Register for IMPS with your bank
- Receive a Mobile Money Identifier (MMID) from the bank
- Receive a MPIN from the bank •

To transfer money through IMPS, the you need to:

Once you have both these, you can login or make a request through SMS to transfer a particular amount to a beneficiary.

For the beneficiary to receive the transferred money, he must:

- 1. Link his mobile number with his respective account
- 2. Receive the MMID from the bank

In order to initiate a money transfer through IMPS, you will need to enter the following information:

- 1. The beneficiary's mobile number
- 2. The beneficiary's MMID

3. The transfer amount

4. Your MPIN

As soon as money has been deducted from your account and credited into the beneficiary's account, you will be sent a confirmation SMS with a transaction reference number, for future reference.

Criteria	NEFT	RTGS	IMPS
Settlement	Done in batches	Real-time	Real-time
Full form	National Electronic Fund Transfer	Real Time Gross Settlement	Immediate Payment Service
Timings on Monday – Friday	8:00 am – 6:30 pm	9:00 am – 4:30 pm	24x7
Timings on Saturday	8:00 am – 1:00 pm	9:00 am – 1:30 pm	24x7
Minimum amount of money transfer limit	₹1	₹2 lacs	₹1
Maximum amount of money transfer limit	₹10 lacs	₹10 lacs per day	₹2 lacs
Maximum charges as per RBI	Up to 10,000 – ₹2.5 above 10,000 – 1 lac – ₹5 above 1 – 2 lacs ₹15 above 2 – 5 lacs ₹25 above 5 – 10 lacs	above 2 – 5 lacs ₹25 above 5 – 10 lacs ₹50	Up to 10,000 – ₹5 above 10,000 – 1 lac – ₹5 above 1 – 2 lacs – ₹15

Fig 6.3.2:NEFT, RTGS &NEFT

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- Never click on any links in any e-mail message to access your online banking website.
- You will never be asked for your credit or debit card details while using online banking.
- Change your online banking password regularly.

# **UNIT 6.4: Preparing for Employment & Self Employment**

# Unit Objectives 🥝

#### At the end of this unit, you will be able to:

- 1. Discuss the steps to prepare for an interview
- 2. Discuss the steps to create an effective Resume
- 3. Discuss the most frequently asked interview questions
- 4. Discuss how to answer the most frequently asked interview questions
- 5. Discuss basic workplace terminology

### 6.4.1 Interview Preparation: How to Prepare for an Interview?

The success of your getting the job that you want depends largely on how well your interview for that job goes. Therefore, before you go in for your interview, it is important that you prepare for it with a fair amount of research and planning. Take a look at the steps to follow in order to be well prepared for an interview:

#### 1. Research the organization that you are having the interview with.

- Studying the company beforehand will help you be more prepared at the time of the interview. Your knowledge of the organization will help you answer questions at the time of the interview, and will leave you looking and feeling more confident. This is sure to make you stand out from other, not as well informed, candidates.
- Look for background information on the company. Ty and find an overview of the company and its industry profile.
- Visit the company website to get a good idea of what the company does. A company website offers a wealth of important information. Read and understand the company's mission statement. Pay attention to the company's products/services and client list. Read through any press releases to get an idea of the company's projected growth and stability.
- Note down any questions that you have after your research has been completed.
- 2. Think about whether your skills and qualifications match the job requirements.
  - Carefully read through and analyse the job description.
  - Make a note of the knowledge, skills and abilities required to fulfil the job requirements.
  - Take a look at the organization hierarchy. Figure out where the position you are applying for fits into this hierarchy.
- 3. Go through the most typical interview questions asked, and prepare your responses.
  - Remember, in most interviews a mix of resume-based, behavioural and case study questions are asked.
  - Think about the kind of answers you would like to provide to typical questions asked in these three areas.
  - Practice these answers until you can express them confidently and clearly.

#### 4. Plan your attire for the interview.

- It is always safest to opt for formal business attire, unless expressly informed to dress in business casual (in which case you should use your best judgement)
- Ensure that your clothes are clean and well-ironed. Pick neutral colours nothing too bright or flashy.
- The shoes you wear should match your clothes, and should be clean and suitable for a n interview.
- Remember, your aim is to leave everyone you meet with the impression that you are a professional and highly efficient person.
- 5. Ensure that you have packed everything that you may require during the interview.
  - Carry a few copies of your resume. Use a good quality paper for your resume print outs.
  - Always take along a notepad and a pen.
  - Take along any information you may need to refer to, in order to fill out an application form.
  - Carry a few samples of your work, if relevant.
- 6. Remember the importance of non-verbal communication.
  - Practice projecting confidence. Remind yourself to smile and make eye contact. Practice giving a firm handshake.
  - Keep in mind the importance of posture. Practice sitting up straight. Train yourself to stop nervous gestures like fidgeting and foot-tapping.
  - Practice keeping your reactions in check. Remember, your facial expressions provide a good insight into your true feelings. Practice projecting a positive image.
- 7. Make a list of questions to end the interview with.
  - Most interviews will end with the interviewer(s) asking if you have any questions. This is your chance to show that you have done your research and are interested in learning more about the company.
  - If the interviewer does not ask you this question, you can inform him/her that you have some queries that you would like to discuss. This is the time for you to refer to the notes you made while studying the company.
  - Some good questions to ask at this point are:
    - What do you consider the most important criteria for success in this job?
    - How will my performance be evaluated?
    - What are the opportunities for advancement?
    - What are the next steps in the hiring process?
  - Remember, never ask for information that is easily available on the company website.

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- Ask insightful and probing questions.
- When communicating, use effective forms of body language like smiling, making eye contact, and actively listening and nodding. Don't slouch, play with nearby items, fidget, chew gum, or mumble.

# 6.4.2 Preparing an Effective Resume: How to Create an Effective Resume?

A resume is a formal document that lists a candidate's work experience, education and skills. A good resume gives a potential employer enough information to believe the applicant is worth interviewing. That's why it is so important to create a résumé that is effective. Take a look at the steps to create an effective resume:

#### Step 1: Write the Address Section

The Address section occupies the top of your resume. It includes information like your name, address, phone number and e-mail address. Insert a bold line under the section to separate it from rest of your resume.

#### Example:

Khyati Mehta Breach Candy, Mumbai – India Contact No: +91 2223678270 Email: jasmine.watts@gmail.com

#### Step 2: Add the Profile Summary Section

This part of your resume should list your overall experiences, achievements, awards, certifications and strengths. You can make your summary as short as 2-3 bullet points or a s long as 8-10 bullet points.

#### Example:

#### **Profile Summary**

- A Floor Supervisor graduated from University of Delhi having 6 years of experience in managing a retail outlet.
- Core expertise lies in managing retail staff, including cashiers and people working on the floor.

#### Step 3: Include Your Educational Qualifications

When listing your academic records, first list your highest degree. Then add the second highest qualification under the highest one and so on. To provide a clear and accurate picture of your educational background, it is critical that include information on your position, rank, percentage or CPI for every degree or certification that you have listed.

If you have done any certifications and trainings, you can add a Trainings & Certifications section under your Educational Qualifications section.

#### Example:

#### **Educational Qualifications**

<Enter qualification> <enter date of qualification> from <enter name of institute> with <enter percentage or any other relevant scoring system>.

#### Step 4: List Your Technical Skills

When listing your technical skills, start with the skills that you are most confident about. Then add the skills that you do not have as good a command over. It is perfectly acceptable to include just one skill, if you feel that particular skill adds tremendous value to your résumé. If you do not have any technical skills, you can omit this step.

Example:

#### **Technical Skills**

• <Enter your technical skill here, if applicable>

#### Step 5: Insert Your Academic Project Experience

List down all the important projects that you have worked on. Include the following information in this section:

- Project title Contribution
- OrganizationDescription

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Platform used

#### Example:

#### Academic Projects

Project Title: <Insert project title> Organization: <Insert the name of the organization for whom you did the project> Platform used: <Insert the platform used, if any> Contribution: <Insert your contribution towards this project> Description: <Insert a description of the project in one line>

#### Step 6: List Your Strengths

This is where you list all your major strengths. This section should be in the form of a bulleted list.

#### Example:

#### Strengths

- Excellent oral, written and presentation skills
- Action-oriented and result-focused
- Great time management skills

#### Step 7: List Your Extracurricular Activities

It is very important to show that you have diverse interests and that your life consists of more than academics. Including your extracurricular activities can give you an added edge over other candidates who have similar academic scores and project experiences. This section should be in the form of a bulleted list.

#### Example:

< Insert your extracurricular activity here. E.g.: Member of, \_\_\_\_\_ played (name of sport) at \_\_\_\_\_ level, won (name of prize/award) for >

#### **Step 8: Write Your Personal Details**

The last section of your résumé must include the following personal information:

- Date of birth
- Nationality

- Gender & marital status
- Languages known

#### Example:

Personal Details

- Date of birth:
- Gender & marital status:
- Nationality:

25<sup>th</sup> May, 1981 Female, Single Indian

Languages known:

English, Hindi, Tamil, French

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- Keep your resume file name short, simple and informational.
- Make sure the resume is neat and free from typing errors.
- Always create your resume on plain white paper.

#### 6.4.3 Interview FAQs

Take a look at some of the most frequently asked interview questions, and some helpful tips on how to answer them.

#### Q1. Can you tell me a little about yourself?

#### Tips to answer:

- Don't provide your full employment or personal history.
- Offer 2-3 specific experiences that you feel are most valuable and relevant.
- Conclude with how those experiences have made you perfect for this specific role.

#### Q2. How did you hear about the position?

#### Tips to answer:

- Tell the interviewer how you heard about the job whether it was through a friend (name the friend), event or article (name them) or a job portal (say which one).
- Explain what excites you about the position and what in particular caught your eye about this role.

#### Q3. What do you know about the company?

#### Tips to answer:

- Don't recite the company's About Us page.
- Show that you understand and care about the company's goals.
- Explain why you believe in the company's mission and values.

#### Q4. Why do you want this job?

#### Tips to answer:

- Show that you are passionate about the job.
- Identify why the role is a great fit for you.
- Explain why you love the company.

#### Q5. Why should we hire you?

#### Tips to answer:

- Prove through your words that you can not only do the work, but can definitely deliver excellent results.
- Explain why you would be a great fit with the team and work culture.
- Explain why you should be chosen over any other candidate.

#### Q6. What are your greatest professional strengths?

#### Tips to answer:

- Be honest share some of your real strengths, rather than give answers that you think sound good.
- Offer examples of specific strengths that are relevant to the position you are applying for.
- Provide examples of how you've demonstrated these strengths.

#### Q7. What do you consider to be your weaknesses?

#### Tips to answer:

- The purpose of this question is to gauge your self-awareness and honesty.
- Give an example of a trait that you struggle with, but that you're working on to improve.

#### Q8. What are your salary requirements?

#### Tips to answer:

- Do your research beforehand and find out the typical salary range for the job you are applying for.
- Figure out where you lie on the pay scale based on your experience, education, and skills.
- Be flexible. Tell the interviewer that you know your skills are valuable, but that you want the job and are willing to negotiate.

#### Q9. What do you like to do outside of work?

#### Tips to answer:

- The purpose of this question is to see if you will fit in with the company culture.
- Be honest open up and share activities and hobbies that interest and excite you.

#### Q10. If you were an animal, which one would you want to be?

#### Tips to answer:

- The purpose of this question is to see if you are able to think on your feet.
- There's no wrong answer but to make a great impression try to bring out your strengths or personality traits through your answer.

#### Q11: What do you think we could do better or differently?

#### Tips to answer:

- The purpose of this question is to see if you have done your research on the company, and to test whether you can think critically and come up with new ideas.
- Suggest new ideas. Show how your interests and expertise would help you execute these ideas.

#### Q12: Do you have any questions for us?

#### Tips to answer:

- Do not ask questions to which the answers can be easily found on the company website or through a quick online search.
- Ask intelligent questions that show your ability to think critically.

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- Be honest and confident while answering.
- Use examples of your past experiences wherever possible to make your answers more impactful.

# 6.4.4 Work Readiness – Terms & Terminologies: Basic Workplace Terminology

Every employee should be well versed in the following terms:

- Annual leave: Paid vacation leave given by employers to employees.
- **Background Check:** A method used by employers to verify the accuracy of the information provided by potential candidates.
- Benefits: A part of an employee's compensation package.
- Breaks: Short periods of rest taken by employees during working hours.
- **Compensation Package:** The combination of salary and benefits that an employer provides to his/her employees.
- Compensatory Time (Comp Time): Time off in lieu of pay.
- **Contract Employee:** An employee who works for one organization that sells said employee's service to another company, either on a project or time basis.
- **Contract of Employment:** When an employee is offered work in exchange for wages or salary, and accepts the offer made by the employer, a contract of employment exists.
- **Corporate Culture:** The beliefs and values shared by all the members of a company, and imparted from one generation of employees to another.
- **Counter Offer/Counter Proposal:** A negotiation technique used by potential candidates to increase the amount of salary offered by a company.
- **Cover Letter:** A letter that accompanies a candidate's resume. It emphasizes the important points in the candidate's resume and provides real examples that prove the candidate's ability to perform the expected job role.
- **Curriculum Vitae (CV)/Resume:** A summary of a candidate's achievements, educational work experience, skills and strengths.
- **Declining Letter:** A letter sent by an employee to an employer, turning down the job offer employer to the employee.
- **Deductions:** Amounts subtracted from an employee's pay and listed on the employee's pay slip.
- **Discrimination:** The act of treating one person not as favourably as another person.
- Employee: A person who works for another person in exchange for payment.
- **Employee Training:** A workshop or in-house training that an employee is asked to attend by his or her superior, for the benefit of the employer.
- Employment Gaps: Periods of unemployed time between jobs.
- **Fixed-Term Contract:** A contract of employment which gets terminated on an agreed-upon date.
- **Follow-Up:** The act of contacting a potential employer after a candidate has submitted his or her resume.
- **Freelancer/Consultant/Independent Contractor:** A person who works for him or herself for temporary jobs and projects with different employers.
- Holiday: Paid time-off from work.
- Hourly Rate: The amount of salary or wages paid for 60 minutes of work.
- **Internship**: A job opportunity offered by an employer to a potential employee, called an at the employer's company for a fixed, limited time period.

- **Interview**: A conversation between a potential employee and a representative of an order to determine if the potential employee should be hired.
- Job Application: A form which asks for a candidate's information like the candidate's name, details and work experience. The purpose of a candidate submitting a job application, is to show that candidate's interest in working for a particular company.
- **Job Offer**: An offer of employment made by an employer to a potential employee.
- Job Search Agent: A program that enables candidates to search for employment opportunities by selecting criteria listed in the program, for job vacancies. background, made by the and pitches intern, to work employer, in address, contact
- Lay Off: A lay off occurs when an employee is temporarily let go from his or her job, due to the employer not having any work for that employee.
- Leave: Formal permission given to an employee, by his or her employer, to take a leave of absence from work.
- Letter of Acceptance: A letter given by an employer to an employee, confirming the offer of employment made by the employer, as well as the conditions of the offer.
- Letter of Agreement: A letter that outlines the terms of employment.
- Letter of Recommendation: A letter written for the purpose of validating the work skills o f a person.
- **Maternity Leave**: Leave taken from work by women who are pregnant, or who have just given birth.
- **Mentor**: A person who is employed at a higher level than you, who offers you advice and guides you in your career.
- Minimum wage: The minimum wage amount paid on an hourly basis.
- **Notice**: An announcement made by an employee or an employer, stating that the employment contract will end on a particular date.
- Offer of Employment: An offer made by an employer to a prospective employee that contains important information pertaining to the job being offered, like the starting date, salary, working conditions etc.
- **Open-Ended Contract**: A contract of employment that continues till the employer or terminates it.
- **Overqualified**: A person who is not suited for a particular job because he or she has too m any years of work experience, or a level of education that is much higher than required f or the job, or is currently or was previously too highly paid.
- **Part-Time Worker**: An employee who works for fewer hours than the standard number of hours normally worked.
- Paternity Leave: Leave granted to a man who has recently become a father.
- **Recruiters/Head-hunters/Executive Search Firms**: Professionals who are paid by employers to search for people to fill particular positions.
- **Resigning/Resignations**: When an employee formally informs his or her employer that he or she is quitting his or her job.
- **Self-Employed**: A person who has his or her own business and does not work in the capacity of an employee.
- **Time Sheet**: A form that is submitted to an employer, by an employee, that contains the number of hours worked every day by the employee.

# **UNIT 6.5: Understanding Entrepreneurship**

# - Unit Objectives 🤘

#### At the end of this unit, you will be able to:

- 1. Discuss the concept of entrepreneurship
- 2. Discuss the importance of entrepreneurship
- 3. Describe the characteristics of an entrepreneur
- 4. Describe the different types of enterprises
- 5. List the qualities of an effective leader
- 6. Discuss the benefits of effective leadership
- 7. List the traits of an effective team
- 8. Discuss the importance of listening effectively
- 9. Discuss how to listen effectively
- 10. Discuss the importance of speaking effectively
- 11. Discuss how to speak effectively
- 12. Discuss how to solve problems
- 13. List important problem solving traits
- 14. Discuss ways to assess problem solving skills
- 15. Discuss the importance of negotiation
- 16. Discuss how to negotiate
- 17. Discuss how to identify new business opportunities
- 18. Discuss how to identify business opportunities within your business
- 19. Explain the meaning of entrepreneur
- 20. Describe the different types of entrepreneurs
- 21. List the characteristics of entrepreneurs
- 22. Recall entrepreneur success stories
- 23. Discuss the entrepreneurial process
- 24. Describe the entrepreneurship ecosystem
- 25. Discuss the purpose of the Make in India campaign
- 26. Discuss key schemes to promote entrepreneurs
- 27. Discuss the relationship between entrepreneurship and risk appetite
- 28. Discuss the relationship between entrepreneurship and resilience
- 29. Describe the characteristics of a resilient entrepreneur
- 30. Discuss how to deal with failure

# 6.5.1 Concept Introduction (Characteristic of Entrepreneur, types of firms / types of enterprises)

#### **Entrepreneurs and Entrepreneurship**

Anyone who is determined to start a business, no matter what the risk, is an entrepreneur. Entrepreneurs run their own start-up, take responsibility for the financial risks and use creativity, innovation and vast reserves of self-motivation to achieve success. They dream big and are determined to do whatever it takes to turn their idea into a viable offering. The aim of a n entrepreneur is to create an enterprise. The process of creating this enterprise is known as entrepreneurship.

#### Importance of Entrepreneurship

- 1. Entrepreneurship is very important for the following reasons:
- 2. It results in the creation of new organizations
- 3. It brings creativity into the marketplace
- 4. It leads to improved standards of living
- 5. It helps develop the economy of a country

#### **Characteristics of Entrepreneurs**

All successful entrepreneurs have certain characteristics in common.

They are all:

- Extremely passionate about their work
- Confident in themselves
- Disciplined and dedicated
- Motivated and driven

Entrepreneurs also have a tendency to:

- Have a high-risk tolerance
- Thoroughly plan everything
- Manage their money wisely
- Make their customers their priority

#### **Examples of Famous Entrepreneurs**

Some famous entrepreneurs are:

- Dhirubhai Ambani (Reliance)
- Dr. Karsanbhai Patel (Nirma)

- Highly creative
- Visionaries
- Open-minded
- Decisive
- Understand their offering and their market in detail
- Ask for advice from experts when required
- Know when to cut their losses
  - Azim Premji (Wipro)
  - Anil Agarwal (Vedanta Resources)

#### **Types of Enterprises**

As an entrepreneur in India, you can own and run any of the following types of enterprises:

#### Sole Proprietorship

In a sole proprietorship, a single individual owns, manages and controls the enterprise. This type of business is the easiest to form with respect to legal formalities. The business and the owner have no separate legal existence. All profit belongs to the proprietor, as do all the losses the liability of the entrepreneur is unlimited.

#### Partnership

A partnership firm is formed by two or more people. The owners of the enterprise are called partners. A partnership deed must be signed by all the partners. The firm and its partners have no separate legal existence. The profits are shared by the partners. With respect to losses, the liability of the partners is unlimited. A firm has a limited life span and must be dissolved when any one of the partners dies, retires, claims bankruptcy or goes insane.

#### Limited Liability Partnership (LLP)

In a Limited Liability Partnership or LLP, the partners of the firm enjoy perpetual existence as well as the advantage of limited liability. Each partner's liability is limited to their agreed contribution to the LLP. The partnership and its partners have a separate legal existence.

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- Learn from others' failures.
- Be certain that this is what you want.
- Search for a problem to solve, rather than look for a problem to attach to your idea.

## 6.5.2 Leadership & Teamwork: Leadership and Leaders

Leadership means setting an example for others to follow. Setting a good example means not asking someone to do something that you wouldn't willingly want to do yourself. Leadership is about figuring out what to do in order to win as a team, and as a company. Leaders believe in doing the right things. They also believe in helping others to do the right things. An effective leader is someone who:

- Creates an inspiring vision of the future.
- Motivates and inspires his team to pursue that vision.

#### Leadership Qualities That All Entrepreneurs Need

Building a successful enterprise is only possible if the entrepreneur in charge possesses excellent leadership qualities. Some critical leadership skills that every entrepreneur must have are:

- 1. **Pragmatism:** This means having the ability to highlight all obstacles and challenges, in order to resolve issues and reduce risks.
- 2. **Humility:** This means admitting to mistakes often and early, and being quick to take responsibility for your actions. Mistakes should be viewed as challenges to overcome, not opportunities to point blame.
- 3. **Flexibility:** It is critical for a good leader to be very flexible and quickly adapt to change. It is equally critical to know when to adapt and when not to.
- 4. **Authenticity:** This means showing both, your strengths and your weaknesses. It means being human and showing others that you are human.
- 5. **Reinvention:** This means refreshing or changing your leadership style when necessary. To do this, it's important to learn where your leadership gaps lie and find out what resources are required to close them.
- 6. Awareness: This means taking the time to recognize how others view you. It means understanding how your presence affects those around you.

#### **Benefits of Effective Leadership**

Effective leadership results in numerous benefits. Great leadership leads to the leader successfully:

- Gaining the loyalty and commitment of the team members
- Motivating the team to work towards achieving the company's goals and objectives
- Building morale and instilling confidence in the team members
- Fostering mutual understanding and team-spirit among team members
- Convincing team members about the need to change when a situation requires adaptability

#### **Teamwork and Teams**

Teamwork occurs when the people in a workplace combine their individual skills to pursue a common goal. Effective teams are made up of individuals who work together to achieve this common goal. A great team is one who holds themselves accountable for the end result.

- 1. **Unity of purpose:** All the team members should clearly understand and be equally committed to the purpose, vision and goals of the team.
- 2. **Great communication skills:** Team members should have the ability to express their concerns, ask questions and use diagrams, and charts to convey complex information.
- 3. **The ability to collaborate:** Every member should feel entitled to provide regular feedback on new ideas.
- 4. **Initiative:** The team should consist of proactive individuals. The members should have the enthusiasm to come up with new ideas, improve existing ideas, and conduct their own research.
- 5. **Visionary members:** The team should have the ability to anticipate problems and act on these potential problems before they turn into real problems.

- 6. **Great adaptability skills:** The team must believe that change is a positive force. Change should be seen as the chance to improve and try new things.
- 7. **Excellent organizational skills:** The team should have the ability to develop standard work processes, balance responsibilities, properly plan projects, and set in place methods to measure progress and ROI.
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  - Don't get too attached to your original idea. Allow it to evolve and change.
  - Be aware of your weaknesses and build a team that will complement your shortfalls.
  - Hiring the right people is not enough. You need to promote or incentivize your most
  - talented people to keep them motivated.
  - Earn your team's respect.

# 6.5.3 Communication Skills: Listening & Speaking the Importance of Listening Effectively

Listening is the ability to correctly receive and understand messages during the process of communication. Listening is critical for effective communication. Without effective listening skills, messages can easily be misunderstood. This results in a communication breakdown and can lead to the sender and the receiver of the message becoming frustrated or irritated. It's very important to note that listening is not the same as hearing. Hearing just refers to sounds that you hear. Listening is a whole lot more than that. To listen, one requires focus. It means not only paying attention to the story, but also focusing on how the story is relayed, the way language and voice is used, and even how the speaker uses their body language. The ability to listen depends on how effectively one can perceive and understand both, verbal and non-verbal cues.

#### How to Listen Effectively?

To listen effectively you should:

- Stop talking
- Stop interrupting
- Focus completely on what is being said
- Nod and use encouraging words and gestures
- Be open-minded

- Pay attention to the tone that is being used
- Pay attention to the speaker's gestures, facial expressions and eye movements
- Not try and rush the person
- Not let the speaker's mannerisms or habits irritate or distract you

- Think about the speaker's perspective
- Be very, very patient

#### The Importance of Speaking Effectively

How successfully a message gets conveyed depends entirely on how effectively you are able to get it through. An effective speaker is one who enunciates properly, pronounces words correctly, chooses the right words and speaks at a pace that is easily understandable. Besides this, the words spoken out loud need to match the gestures, tone and body language used. What you say, and the tone in which you say it, results in numerous perceptions being formed. A person who speaks hesitantly may be perceived as having low

self-esteem or lacking in knowledge of the discussed topic. Those with a quiet voice may very well be labelled as shy. And those who speak in commanding tones with high levels of clarity, are usually considered to be extremely confident. This makes speaking a very critical communication skill.

#### How to Speak Effectively?

To speak effectively you should:

- Incorporate body language in your speech like eye contact, smiling, nodding, gesturing etc.
- Build a draft of your speech before actually making your speech.
- Ensure that all your emotions and feelings are under control.
- Pronounce your words distinctly with the correct pitch and intensity. Your speech should be crystal clear at all times. Use a pleasant and natural tone when speaking. Your audience should not feel like you are putting on an accent or being unnatural in any way.
- Use precise and specific words to drive your message home. Ambiguity should be avoided at all costs.
- Ensure that your speech has a logical flow.
- Be brief. Don't add any unnecessary information.
- Make a conscious effort to avoid irritating mannerisms like fidgeting, twitching etc.
- Choose your words carefully and use simple words that the majority of the audience will have no difficulty understanding.
- Use visual aids like slides or a whiteboard.
- Speak slowly so that your audience can easily understand what you're saying. However, be careful not to speak too slowly because this can come across as stiff, unprepared or even condescending.
- Remember to pause at the right moments.

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- If you're finding it difficult to focus on what someone is saying, try repeating their words in your head.
- Always maintain eye contact with the person that you are communicating with, when speaking as well as listening. This conveys and also encourages interest in the conversation.

# 6.5.4 Problem Solving & Negotiation Skills: What is a Problem?

As per The Concise Oxford Dictionary (1995), a problem is, "A doubtful or difficult matter requiring a solution"

All problems contain two elements:

1. Goals

2. Obstacles

The aim of problem solving is to recognize the obstacles and remove them in order to achieve the goals.

#### How to Solve Problems?

Solving a problem requires a level of rational thinking. Here are some logical steps to follow when faced with an issue:

Step 1: Identify the problem

**Step 3:** List all possible solutions

**Step 5:** Implement the chosen solution

Step 2: Study the problem in detailStep 4: Select the best solutionStep 6: Check that the problem has really been solved

#### **Important Traits for Problem Solving**

Highly developed problem solving skills are critical for both, business owners and their employees. The following personality traits play a big role in how effectively problems are solved:

Being open minded	Not panicking
Asking the right questions	Having a positive attitude
Being proactive	Focusing on the right problem

#### How to Assess for Problem Solving Skills?

As an entrepreneur, it would be a good idea to assess the level of problem solving skills of potential candidates before hiring them. Some ways to assess this skill are through:

- 1. Application forms: Ask for proof of the candidate's problem solving skills in the application form.
- 2. Psychometric tests: Give potential candidates logical reasoning and critical thinking tests and see how they fare.

- 3. Interviews: Create hypothetical problematic situations or raise ethical questions and see how the candidates respond.
- 4. Technical questions: Give candidates examples of real life problems and evaluate their thought process.

#### What is Negotiation?

Negotiation is a method used to settle differences. The aim of negotiation is to resolve differences through a compromise or agreement while avoiding disputes. Without negotiation, conflicts are likely to lead to resentment between people. Good negotiation skills help satisfy both parties and go a long way towards developing strong relationships.

#### Why Negotiate?

Starting a business requires many, many negotiations. Some negotiations are small while others are critical enough to make or break a start-up. Negotiation also plays a big role inside the workplace. As an entrepreneur, you need to know not only know how to negotiate yourself, but also how to train employees in the art of negotiation.

#### How to Negotiate?



Take a look at some steps to help you negotiate:

Agree on where to meet to discuss the problem,	
decide who all will be present and set a time limit for	
the discussion.	
This involves asking questions, listening to the other	
side, puttingyour views forward and clarifying	
doubts.	
Ensure that both parties want to solve the same	
problem and reach the same goal.	
Try your best to be open minded when negotiating.	
Compromise and offer alternate solutions to reach	
an outcome where both parties win.	
When an agreement has been reached, the details of	
the agreement should be crystal clear to both sides,	
with no scope for misunderstandings.	
Agree on a course of action to set the solution in	
motion	

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- Know exactly what you want before you work towards getting it
- Give more importance to listening and thinking, than speaking
- Focus on building a relationship rather than winning
- Remember that your people skills will affect the outcome
- Know when to walk away sometimes reaching an agreement may not be possible

# 6.5.5 Business Opportunities Identification: Entrepreneurs and Opportunities

"The entrepreneur always searches for change, responds to it and exploits it as an opportunity." Peter Drucker The ability to identify business opportunities is an essential characteristic of an entrepreneur.

#### What is an Opportunity?

The word opportunity suggests a good chance or a favourable situation to do something offered by circumstances.

#### **Common Questions Faced by Entrepreneurs**

A critical question that all entrepreneurs face is how to go about finding the business opportunity that is right for them.

- Some common questions that entrepreneurs constantly think about are:
- Should the new enterprise introduce a new product or service based on an unmet need?
- Should the new enterprise select an existing product or service from one market and offer it in another where it may not be available?
- Should the enterprise be based on a tried and tested formula that has worked elsewhere?

It is therefore extremely important that entrepreneurs must learn how to identify new and existing business opportunities and evaluate their chances of success.

#### When is an Idea an Opportunity?

An idea is an opportunity when:

- It creates or adds value to a customer
- It solves a significant problem, removes a pain point or meets a demand
- Has a robust market and profit margin
- Is a good fit with the founder and management team at the right time and place

#### **Factors to Consider When Looking for Opportunities**

Consider the following when looking for business opportunities:

- Economic trends
- Changes in funding

- Market trends
- Changes in political support
- Changing relationships between vendors, partners and suppliers
- Shift in target audience

#### Ways to Identify New Business Opportunities

1. Identify Market Inefficiencies

When looking at a market, consider what inefficiencies are present in the market. Think about ways to correct these inefficiencies.

#### 2. Remove Key Hassles

Rather than create a new product or service, you can innovatively improve a product, service or process.

#### 3. Create Something New

Think about how you can create a new experience for customers, based on existing business models.

#### 4. Pick a Growing Sector/Industry

Research and find out which sectors or industries are growing and think about what opportunities you can tap in the same.

#### 5. Think About Product Differentiation

If you already have a product in mind, think about ways to set it apart from the existing ones.

#### Ways to Identify Business Opportunities Within Your Business

#### 1. SWOT Analysis

An excellent way to identify opportunities inside your business is by creating a SWOT analysis. The acronym SWOT stands for strengths, weaknesses, opportunities, and threats. SWOT analysis framework:



Fig.6.5.1. SWOT Analysis

#### Consider the following when looking for business opportunities:

By looking at yourself and your competitors using the SWOT framework, you can uncover opportunities that you can exploit, as well as manage and eliminate threats that could derail your success.

#### 2. Establishing Your USP

Establish your USP and position yourself as different from your competitors. Identify why customers should buy from you and promote that reason.

#### **Opportunity Analysis**

Once you have identified an opportunity, you need to analyse it.

To analyse an opportunity, you must:

- Remember, opportunities are situational.
- Avoid the latest craze.
- Look for a proven track record.
- Love your idea.

## 6.5.6 Entrepreneurship Support Eco-System: Who is an

### **Entrepreneur?**

An entrepreneur is a person who:

- Does not work for an employee
- Runs a small enterprise
- Assumes all the risks and rewards of the enterprise, idea, good or service

#### **Types of Entrepreneurs**

There are four main types of entrepreneurs:

- 1. The Traditional Entrepreneur: This type of entrepreneur usually has some kind of skill they can be a carpenter, mechanic, cook etc. They have businesses that have been around for numerous years like restaurants, shops and carpenters. Typically, they gain plenty of experience in a particular industry before they begin their own business in a similar field.
- 2. The Growth Potential Entrepreneur: The desire of this type of entrepreneur is to start an enterprise that will grow, win many customers and make lots of money. Their ultimate aim is to eventually sell their enterprise for a nice profit. Such entrepreneurs usually have a science or technical background.
- 3. **The Project-Oriented Entrepreneur:** This type of entrepreneur generally has a background in the Arts or psychology. Their enterprises tend to be focus on something that they are very passionate about.
- 4. **The Lifestyle Entrepreneur:** This type of entrepreneur has usually worked as a teacher or a secretary. They are more interested in selling something that people will enjoy, rather than making lots of money.

#### **Characteristics of an Entrepreneur**

Successful entrepreneurs have the following characteristics:

- They are highly motivated
- They are creative and persuasive
- They are mentally prepared to handle each and every task
- They have excellent business skills they know how to evaluate their cash flow, sales and revenue
- They are willing to take great risks
- They are very proactive this means they are willing to do the work themselves, rather than wait for someone else to do it
- They have a vision they are able to see the big picture
- They are flexible and open-minded
- They are good at making decisions

#### **Entrepreneur Success Stories**

#### Dhiru Bhai Ambani

Dhirubhai Ambani began his entrepreneurial career by selling "bhajias" to pilgrims in Mount Girnar on weekends. At 16, he moved to Yemen where he worked as a gas-station attendant, and as a clerk in an oil company. He returned to India with Rs. 50,000 and started a textile trading company. Reliance went on to become the first Indian company to raise money in global markets and the first Indian company to feature in Forbes 500 list.

#### Dr. Karsanbhai Patel

Karsanbhai Patel made detergent powder in the backyard of his house. He sold his product door-to door and offered a money back guarantee with every pack that was sold. He charged Rs.3 per kg when the cheapest detergent at that time was Rs.13 per kg. Dr. Patel eventually started Nirma which became a whole new segment in the Indian domestic detergent market.

#### The Entrepreneurial Process



Let's take a look at the stages of the entrepreneurial process.

Stage 1: Idea Generation. The entrepreneurial process begins with an idea that has been thought of by the entrepreneur. The idea is a problem that has the potential to be solved.Stage 2: Germination or Recognition. In this stage a possible solution to the identified

problem is thought of. **Stage 3:** Preparation or Rationalization. The problem is studied further and research is done

to find out how others have tried to solve the same problem.

**Stage 4:** Incubation or Fantasizing. This stage involves creative thinking for the purpose of coming up with more ideas. Less thought is given to the problem areas.

**Stage 5:** Feasibility Study: The next step is the creation of a feasibility study to determine if the idea will make a profit and if it should be seen through.

**Stage 6:** Illumination or Realization. This is when all uncertain areas suddenly become clear. The entrepreneur feels confident that his idea has merit.

**Stage 7:** Verification or Validation. In this final stage, the idea is verified to see if it works and if it is useful.



Fig.6.5.2: Entrepreneurial process

#### Introduction to the Entrepreneurship Ecosystem

The entrepreneurship support ecosystem signifies the collective and complete nature of entrepreneurship. New companies emerge and flourish not only because of the courageous, visionary entrepreneurs who launch them, but they thrive as they are set in an environment or 'ecosystem' made of private and public participants. These players nurture and sustain the new ventures, facilitating the entrepreneurs' efforts. An entrepreneurship ecosystem comprises of the following six domains:

- 1. **Favourable Culture:** This includes elements such as tolerance of risk and errors, valuable networking and positive social standing of the entrepreneur.
- 2. Facilitating Policies & Leadership: This includes regulatory framework incentives and existence of public research institutes.
- 3. **Financing Options:** Angel financing, venture capitalists and micro loans would be good examples of this.
- 4. **Human Capital:** This refers to trained and untrained labour, entrepreneurs and entrepreneurship training programmes, etc.
- 5. **Conducive Markets for Products & Services:** This refers to an existence or scope of existence of a market for the product/service.
- 6. **Institutional & Infrastructural Support:** This includes legal and financing advisers, telecommunications, digital and transportation infrastructure, and entrepreneurship networking programmes.

These domains indicate whether there is a strong entrepreneurship support ecosystem and what actions should the government put in place to further encourage this ecosystem.


Every entrepreneurship support ecosystem is unique and all the elements of the ecosystem are interdependent. Although every region's entrepreneurship ecosystem can be broadly described by the above features, each ecosystem is the result of the hundred elements interacting in highly complex and particular ways.

Entrepreneurship ecosystems eventually become (largely) self-sustaining. When the six domains are resilient enough, they are mutually beneficial. At this point, government involvement can and should be significantly minimized. Public leaders do not need to invest a lot to sustain the ecosystem. It is imperative that the entrepreneurship ecosystem incentives are formulated to be self-liquidating, hence focussing on sustain ability of the environment.

### Make in India Campaign

Every entrepreneur has certain needs. Some of their important needs are:

- To easily get loans
- To easily find investors
- To get tax exemptions
- To easily access resources and good infrastructure
- To enjoy a procedure that is free of hassles and is quick
- To be able to easily partner with other firms

The Make in India campaign, launched by Prime Minister Modi aims to satisfy all these needs of young, aspiring entrepreneurs. Its objective is to:

- Make investment easy
- Support new ideas
- Enhance skill development
- Safeguard the ideas of entrepreneurs
- Create state-of-the-art facilities for manufacturing goods

### Key Schemes to Promote EntrepreneurS

The government offers many schemes to support entrepreneurs. These schemes are run by various Ministries/Departments of Government of India to support First Generation Entrepreneurs. Take a look at a few key schemes to promote entrepreneurship:

### SI. Name of the Scheme

- 1. Pradhan Mantri MUDRA Yojana Micro Units Development and Refinance Agency (MUDRA),
- 2. STAND UP INDIA
- 3. Prime Minister Employment Generation Programme (PMEGP)
- 4. International Cooperation
- 5. Performance and Credit Rating
- 6. Marketing Assistance Scheme
- 7. Reimbursement of Registration Fee for Bar Coding
- 8. Enable Participation of MSMEs in State/District level Trade Fairs and Provide Funding Support
- 9. Capital Subsidy Support on Credit for Technology up gradation
- 10. Credit Guarantee Fund for Micro and Small Enterprise (CGFMSE)
- 11. Reimbursement of Certification Fees for Acquiring ISO Standards

- 12. Agricultural Marketing
- 13. Small Agricultural Marketing
- 14. Mega Food Park
- 15. Adivasi Mahila Sashaktikaran Yojana
- 1. Pradhan Mantri MUDRA Yojana, Micro Units Development and Refinance Agency (MUDRA),

### Description

Under the aegis support of Pradhan Mantra MUDRA Yojana, MUDRA has already created its initial products/schemes. The interventions have been named 'Shisha', 'Kishore' and 'Taren' to signify the stage of growth/development and funding needs of the beneficiary micro unit/entrepreneur and also provide a reference point for the next phase of graduation/growth to look forward to:

- a. Shisha: Covering loans up to Rs. 50,000/-
- b. Kishor: Covering loans above Rs. 50,000/- and up to Rs.5 lakh
- c. Tarun: Covering loans above Rs. 5 lakh to Rs.10 lakh

### Who can apply?

Any Indian citizen who has a business plan for a non-farm sector income generating activity such as manufacturing, processing, trading or service sector and whose credit need is less than Rs.10 lakh can approach either a Bank, MFI, or NBFC for availing of MUDRA loans under Pradhan Mantri Mudra Yojana (PMMY).

### 2. Stand Up India

### Description

The objective of the Standup India scheme is to facilitate bank loans between Rs.10 lakh and Rs.1 crore to at least one Schedule Caste (SC) or Scheduled Tribe (ST) borrower and at least one woman borrower per bank branch for setting up a Greenfield enterprise. This enterprise may be in manufacturing, services or the trading sector. In case of non-Individual enterprises at least 51% of the shareholding and controlling stake should be held be either an SC/ST or Woman Entrepreneur.

### Who can apply?

ST, SC & Women

### 3. Prime Minister Employment Generation Programme (PMEGP)

### Description

The Scheme is implemented by Khadi and Village Industries Commission (KVIC), as the nodal agency at the National level. At the State level, the Scheme is implemented through State KVIC Directorates, State Khadi and Village Industries Boards (KVIBs) and District Industries Centres (DICs) and banks. The Government subsidy under the Scheme is routed by KVIC through identified banks for eventual distribution to the beneficiaries/entrepreneurs in their bank accounts.

### Nature of assistance

The maximum cost of the project/unit admissible under manufacturing sector is Rs.25 lakh and under business/service sector is Rs.10 lakh. Levels of funding under PMEGP

Categories of beneficiaries under PMEGP	Beneficiary's contribution (of project cost)	Rate of Subsidy (of project cost)
Area (location of project/unit)		Urban Rural
General Category	10%	15% 25%
Special (including SC / ST / OBC / Minorities / Women, Ex- servicemen, Physically handicapped, NER, Hill and Border areas, etc.	05%	25% 35%

Fig.6.5.4. PMEGP

The balance amount of the total project cost will be provided by Banks as term loan as well as working capital.

### Who can apply?

Any individual, above 18 years of age. At least VIII standard pass for projects costing above Rs.10 lakh in the manufacturing sector and above Rs.5 lakh in the business/service sector. Only new projects are considered for sanction under PMEGP. Self Help Groups (including those belonging to BPL provided that they have not availed benefits under any other Scheme), Institutions registered under Societies Registration Act, 1860; Production Cooperative Societies, and Charitable Trusts are also eligible. Existing Units (under PMRY, REGP or any other scheme of Government of India or State Government) and the units that have already availed Government Subsidy under any other scheme of Government of India or State Government of India or State Government are NOT eligible.

### 4. International Cooperation

#### Description

The Scheme would cover the following activities:

- Deputation of MSME business delegations to other countries for exploring new areas of technology infusion/upgradation, facilitating joint ventures, improving market of MSMEs products, foreign collaborations, etc.
- Participation by Indian MSMEs in international exhibitions, trade fairs and buyer-seller meets in foreign countries as well as in India, in which there is international participation.
- c. Holding international conferences and seminars on topics and themes of interest to the MSME.

### Nature of assistance

IC Scheme provides financial assistance towards the airfare and space rent of entrepreneurs. Assistance is provided on the basis of size and the type of the enterprise.

### Who can apply?

- a. State/Central Government Organisations;
- b. Industry/Enterprise Associations; and

c. Registered Societies/Trusts and Organisations associated with the promotion and development of MSMEs

### 5. Performance and Credit Rating for Micro and Small Enterprises

### Description

The objective of the Scheme is to create awareness amongst micro & small enterprises about the strengths and weaknesses of their operations and also their credit worthiness.

Turn Over	Fee to be reimbursed by Ministry of MSME
Up to Rs.50 lacs	75% of the fee charged by the rating agency subject to a ceiling Rs. 15,000/-
Above Rs.50 lacs to Rs.200 Lacs	75% of the fee charged by the rating agency subject to a ceiling of Rs.30,0001-
Above Rs.200 lacs	75% of the fee charged by the rating agency subject

Fig.6.5.5: Small enterprises

### Nature of assistance

### Who can apply?

Any enterprise registered in India as a micro or small enterprise is eligible to apply.

### 6. Marketing Assistance Scheme

### Description

The assistance is provided for the following activities:

- a. Organizing exhibitions abroad and participation in international exhibitions/trade fairs
- b. Co-sponsoring of exhibitions organized by other organisations/industry associations/agencies
- c. Organizing buyer-seller meets, intensive campaigns and marketing promotion events

### Nature of assistance

Financial assistance of up to 95% of the airfare and space rent of entrepreneurs. Assistance is provided on the basis of size and the type of the enterprise. Financial assistance for co-sponsoring would be limited to 40% of the net expenditure, subject to maximum amount of Rs.5 lakh.

### Who can apply?

MSMEs, Industry Associations and other organizations related to MSME sector.

## 7. Reimbursement of Registration Fee for Bar Coding Description

The financial assistance is provided towards 75% reimbursement of only one-time registration fee and 75% of annual recurring fee for first three years paid by MSEs to GS1 India for using bar coding.

### Nature of assistance

Funding support for reimbursement of 75% of one time and recurring bar code registration fees.

### Who can apply?

All MSMEs with EM registration.

8. Enabling Participation of MSMEs in State/District Level Trade Fairs and Provide Funding Support

### Description

Provide marketing platform to manufacturing MSMEs by enabling their participation in state/district level exhibitions being organized by state/district authorities/associations.

#### Nature of assistance

1. Free registration for participating in trade fairs

**Note**: *The selection of participants would be done by the MSME-DIs post the submission of application.* 

2. Reimbursement of 50% of to and fro actual fare by shortest distance/direct train (limited to AC II tier class) from the nearest railway station/bus fare to the place of exhibition and 50% space rental charges for MSMEs (General category entrepreneurs).

3. For Women/SC/ST entrepreneurs & entrepreneurs from North Eastern Region Govt. of India will reimburse 80% of items listed above in Point (2).

**Note:** The total reimbursement will be max. Rs. 30,000/- per unit for the SC/ST/Women/Physically Handicapped entrepreneurs, while for the other units the max. limit will be Rs. 20,000/- per person per MSME unit.

**Note**: The participant is required to submit follow-up proofs post attending the event to claim reimbursement. The proofs can be submitted after logging in online under the section "My Applications" or directly contacting a DI office.

### Who can apply?

All MSMEs with EM registration.

### 9. Capital Subsidy Support on Credit for Technology Upgradation

### Description

MSMEs can get a capital subsidy (~15%) on credit availed for technology upgradation.

### Nature of assistance

Financial assistance for availing credit and loan.

### Who can apply?

1. Banks and financial institutions can apply to DC-MSME for availing support.

2. MSMEs need to directly contact the respective banks for getting credit and capital subsidy.

### How to apply?

If you are a financial institution, click on the "Apply Now" button or else you can also directly contact the Office of DC-MSME. You can view the contact details of Office of DC-MSME. If you are an MSME, directly contact the respective banks/financial institutions as listed in the scheme guidelines.

### **10.** Provision of Collateral Free Credit for MSMEs

### Description

Banks and financial institutions are provided funding assistance under this scheme so that they can in turn lend collateral free credit to MSMEs.

### Nature of assistance

Funding support to banks and financial institutions for lending collateral-free credit to MSMEs.

### Who can apply?

Banks and financial institutions can apply to office of DC-MSME/MSME-DIs for availing support. MSMEs need to directly contact the respective banks for getting credit.

### 11. Reimbursement of certification fees for acquiring ISO standards

ISO 9000/ISO 14001 Certification Reimbursement.

### Description

The GoI assistance will be provided for one-time reimbursement of expenditure to such MSME manufacturing units which acquire ISO 18000/ISO 22000/ISO 27000 certification.

### Nature of assistance

Reimbursement of expenditure incurred on acquiring ISO standards.

### Who can apply?

MSMEs with EM registration.

### 12. Agricultural Marketing

### Description

A capital investment subsidy for construction/renovation of rural godowns . Creation of scientific storage capacity and prevention of distress sale.

### Nature of assistance

Subsidy @ 25% to farmers, 15% of project cost to companies.

### Who can apply?

NGOs, SHGs, companies, co-operatives.

#### 13. Small Agricultural Marketing

### Description

Business development description provides venture capital assistance in the form of equity, and arranges training and visits of agri-preneurs

### Farmers' Agriculture Business Consortium

Business development description provides venture capital assistance in the form of equity, and arranges training and visits of agri-preneurs.

### Nature of assistance

Financial assistance with a ceiling of Rs.5 lakh.

### Who can apply?

Individuals, farmers, producer groups, partnership/propriety firms, SGHs, agri-preneurs, etc.

### 14. Mega Food Park

### Description

Mechanism to link agricultural production and market to maximize value addition, enhance farmer's income, create rural employment.

### Nature of assistance

One-time capital grant of 50% of project cost with a limit of Rs.50 crore.

### Who can apply?

Farmers, farmer groups, SHGs.

### 15. Adivasi Mahila Sashaktikaran Yojana

### Description

Concessional scheme for the economic development of ST women.

#### Nature of assistance

Term loan at concessional rates up to 90% of cost of scheme.

### Who can apply?

Scheduled Tribes Women.

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- Research the existing market, network with other entrepreneurs, venture capitalists, angel investors, and thoroughly review the policies in place to enable your entrepreneurship.
- Failure is a stepping stone and not the end of the road. Review yours and your peers' errors and correct them in your future venture.
- Be proactive in your ecosystem. Identify the key features of your ecosystem and enrich them to ensure self-sustainability of your entrepreneurship support ecosystem.

### 6.5.7 Risk Appetite & Resilience: Entrepreneurship and Risk

Entrepreneurs are inherently risk takers. They are path-makers not path-takers. Unlike a normal, cautious person, an entrepreneur would not think twice about quitting his job (his sole income) and taking a risk on himself and his idea.

An entrepreneur is aware that while pursuing his dreams, assumptions can be proven wrong and unforeseen events may arise. He knows that after dealing with numerous problems, success is still not guaranteed. Entrepreneurship is synonymous with the ability to take risks. This ability, called risk-appetite, is an entrepreneurial trait that is partly genetic and partly acquired.

### What is Risk Appetite?

Risk appetite is defined as the extent to which a company is equipped to take risk, in order to achieve its objectives. Essentially, it refers to the balance, struck by the company, between possible profits and the hazards caused by changes in the environment (economic ecosystem, policies, etc.). Taking on more risk may lead to higher rewards but have a high probability of losses as well. However, being too conservative may go against the company as it can miss out on good opportunities to grow and reach their objectives. The levels of risk appetite can be broadly categorized as "low", "medium" and "high." The company's entrepreneur(s) have to evaluate all potential alternatives and select the option most likely to succeed. Companies have varying levels of risk appetites for different objectives.

The levels depend on:

- The type of industry
- Market pressures
- Company objectives

For example, a start-up with a revolutionary concept will have a very high risk appetite. The start-up can afford short term failures before it achieves longer term success. This type of appetite will not remain constant and will be adjusted to account for the present circumstances of the company.

### **Risk Appetite Statement**

Companies have to define and articulate their risk appetite in sync with decisions made about their objectives and opportunities. The point of having a risk appetite statement is to have a framework that clearly states the acceptance and management of risk in business. It sets risk taking limits within the company. The risk appetite statement should convey the following:

- The nature of risks the business faces.
- Which risks the company is comfortable taking on and which risks are unacceptable.
- The nature of risks the business faces.
- Which risks the company is comfortable taking on and which risks are unacceptable.
- How much risk to accept in all the risk categories.
- The desired trade-off between risk and reward.
- Measures of risk and methods of examining and regulating risk exposures.

### **Entrepreneurship and Resilience**

Entrepreneurs are characterized by a set of qualities known as resilience. These qualities play an especially large role in the early stages of developing an enterprise. Risk resilience is an extremely valuable characteristic as it is believed to protect entrepreneurs against the threat of challenges and changes in the business environment.

### What is Entrepreneurial Resilience?

Resilience is used to describe individuals who have the ability to overcome setbacks related to their life and career aspirations. A resilient person is someone who is capable of easily and quickly recovering from setbacks. For the entrepreneur, resilience is a critical trait.

Entrepreneurial resilience can be enhanced in the following ways:

- By developing a professional network of coaches and mentors •
- By accepting that change is a part of life
- By viewing obstacles as something that can be overcome •

### **Characteristics of a Resilient Entrepreneur**

The characteristics required to make an entrepreneur resilient enough to go the whole way in their business enterprise are:

- A strong internal sense of control •
- Ability to diversify and expand • Strong social connections
- Skill to learn from setbacks
- Cash-flow conscious habits
- Ability to look at the bigger picture

Survivor attitude •

Attention to detail

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- Cultivate a great network of clients, suppliers, peers, friends and family. This will • not only help you promote your business, but will also help you learn, identify new opportunities and stay tuned to changes in the market.
- Don't dwell on setbacks. Focus on what the you need to do next to get moving again.
- While you should try, and curtail expenses, ensure that it is not at the cost of your • growth.

# 6.5.8 Success & Failures: Understanding Successes and Failures in Entrepreneurship

Shyam is a famous entrepreneur, known for his success story. But what most people don't know, is that Shyam failed numerous times before his enterprise became a success. Read his interview to get an idea of what entrepreneurship is really about, straight from an entrepreneur who has both, failed and succeeded.

**Interviewer:** Shyam, I have heard that entrepreneurs are great risk-takers who are never afraid of failing. Is this true?

**Shyam:** Ha ha, no of course it's not true! Most people believe that entrepreneurs need to be fearlessly enthusiastic. But the truth is, fear is a very normal and valid human reaction, especially when you are planning to start your own business! In fact, my biggest fear was the fear of failing. The reality is, entrepreneurs fail as much as they succeed. The trick is to not allow the fear of failing to stop you from going ahead with your plans. Remember, failures are lessons for future success!

Interviewer: What, according to you, is the reason that entrepreneurs fail?

**Shyam:** Well, there is no one single reason why entrepreneurs fail. An entrepreneur can fail due to numerous reasons. You could fail because you have allowed your fear of failure to defeat you. You could fail because you are unwilling to delegate (distribute) work. As the saying goes, "You can do anything, but not everything!" You could fail because you gave up too easily – maybe you were not persistent enough. You could fail because you were focusing your energy on small, insignificant tasks and ignoring the tasks that were most important. Other reasons for failing are partnering with the wrong people, not being able to sell your product to the right customers at the right time at the right price... and many more reasons!

Interviewer: As an entrepreneur, how do you feel failure should be looked at?

**Shyam:** I believe we should all look at failure as an asset, rather than as something negative. The way I see it, if you have an idea, you should try to make it work, even if there is a chance that you will fail. That's because not trying is failure right there, anyway! And failure is not the worst thing that can happen. I think having regrets because of not trying, and wondering 'what if' is far worse than trying and actually failing.

Interviewer: How did you feel when you failed for the first time?

**Shyam:** I was completely heartbroken! It was a very painful experience. But the good news is, you do recover from the failure. And with every subsequent failure, the recovery process gets a lot easier. That's because you start to see each failure more as a lesson that will eventually help you succeed, rather than as an obstacle that you cannot overcome. You will start to realize that failure has many benefits.

Interviewer: Can you tell us about some of the benefits of failing?

**Shyam:** One of the benefits that I have experienced personally from failing is that the failure made me see things in a new light. It gave me answers that I didn't have before. Failure can make you a lot stronger. It also helps keep your ego in control.

**Interviewer:** What advice would you give entrepreneurs who are about to start their own enterprises?

**Shyam:** I would tell them to do their research and ensure that their product is something that is actually wanted by customers. I'd tell them to pick their partners and employees very wisely and cautiously. I'd tell them that it's very important to be aggressive – push and market your product as aggressively as possible. I would warn them that starting an enterprise is very expensive and that they should be prepared for a situation where they run out of money. I would tell them to create long term goals and put a plan in action to achieve that goal. I would tell them to build a product that is truly unique. Be very careful and ensure that you are not copying another start-up. Lastly, I'd tell them that it's very important that they find the right investors.

**Interviewer:** That's some really helpful advice, Shyam! I'm sure this will help all entrepreneurs to be more prepared before they begin their journey! Thank you for all your insight!

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- Remember that nothing is impossible.
- Identify your mission and your purpose before you start.
- Plan your next steps don't make decisions hastily.

### **UNIT 6.6: Preparing to be an Entrepreneur**

## Unit Objectives 🥝

### At the end of this unit, you will be able to:

- 1. Discuss how market research is carried out
- 2. Describe the 4 Ps of marketing
- 3. Discuss the importance of idea generation
- 4. Recall basic business terminology
- 5. Discuss the need for CRM
- 6. Discuss the benefits of CRM
- 7. Discuss the need for networking
- 8. Discuss the benefits of networking
- 9. Discuss the importance of setting goals
- 10. Differentiate between short-term, medium-term and long-term goals
- 11. Discuss how to write a business plan
- 12. Explain the financial planning process
- 13. Discuss ways to manage your risk
- 14. Describe the procedure and formalities for applying for bank finance
- 15. Discuss how to manage your own enterprise
- 16. List important questions that every entrepreneur should ask before starting an enterprise

## 6.6.1 Market Study / The 4 Ps of Marketing / Importance of an – IDEA: Understanding Market Research

Market research is the process of gathering, analysing and interpreting market information on a product or service that is being sold in that market. It also includes information on:

- Past, present and prospective customers
- Customer characteristics and spending habits
- The location and needs of the target market
- The overall industry
- Relevant competitors

Market research involves two types of data:

- Primary information. This is research collected by yourself or by someone hired by you.
- Secondary information. This is research that already exists and is out there for you to find and use.

### **Primary research**

Primary research can be of two types:

- Exploratory: This is open-ended and usually involves detailed, unstructured interviews.
- Specific: This is precise and involves structured, formal interviews. Conducting specific

### Secondary research

Secondary research uses outside information. Some common secondary sources are:

- **Public sources:** These are usually free and have a lot of good information. Examples are government departments, business departments of public libraries etc.
- Commercial sources: These offer valuable information but usually require a fee to be paid. Examples are research and trade associations, banks and other financial institutions etc.
- Educational institutions: These offer a wealth of information. Examples are colleges, universities, technical institutes etc.

### The 4 Ps of Marketing

The 4 Ps of marketing are Product, Price, Promotion and Place. Let's look at each of these 4 Ps in detail.

#### Product

A product can be:

- A tangible good
- An intangible service

Whatever your product is, it is critical that you have a clear understanding of what you are offering, and what its unique characteristics are, before you begin with the marketing process.

Some questions to ask yourself are:

- What does the customer want from the product/service?
- What needs does it satisfy?
- Are there any more features that can be added?
- Does it have any expensive and unnecessary features?

- How will customers use it?
- What should it be called?
- How is it different from similar products?
- How much will it cost to produce?

#### Price

Once all the elements of Product have been established, the Price factor needs to be considered. The Price of a Product will depend on several factors such as profit margins, supply, demand and the marketing strategy.

Some questions to ask yourself are:

What is the value of the	Is the customer price sensitive?
product/service to customers?	
Do local products/services have established price points?	Should discounts be offered?
	How is your price compared to that of your competitors?
Fig 6.6.1: Questions	of your competitors:

### Promotion

Once you are certain about your Product and your Price, the next step is to look at ways to promote it. Some key elements of promotion are advertising, public relations, social media marketing, email marketing, search engine marketing, video marketing and more. Some questions to ask yourself are:

- Where should you promote your product or service?
- What is the best medium to use to reach your target audience
- When would be the best time to promote your product?
- How are your competitors promoting their products?

### Place

According to most marketers, the basis of marketing is about offering the right product, at the right price, at the right place, at the right time. For this reason, selecting the best possible location is critical for converting prospective clients into actual clients.

Some questions to ask yourself are:

- Will your product or service be looked for in a physical store, online or both?
- What should you do to access the most appropriate distribution channels?
- Will you require a sales force?

- Where are your competitors offering their products or services?
- Should you follow in your competitors' footsteps?
- Should you do something different from your competitors?

### Importance of an IDEA

Some questions to ask yourself are:

Ideas are the foundation of progress. An idea can be small or ground-breaking, easy to accomplish or extremely complicated to implement. Whatever the case, the fact that it is an idea gives it merit. Without ideas, nothing is possible. Most people are afraid to speak out their ideas, out for fear of being ridiculed. However, if are an entrepreneur and want to remain competitive and innovative, you need to bring your ideas out into the light. Some ways to do this are by:

- Establishing a culture of brainstorming where you invite all interested parties to contribute
- Discussing ideas out loud so that people can add their ideas, views, opinions to them
- Being open minded and not limiting your ideas, even if the idea who have seems ridiculous
- Not discarding ideas that you don't work on immediately, but instead making a note of them and shelving them so they can be revisited at a later date.

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- Keep in mind that good ideas do not always have to be unique.
- Remember that timing plays a huge role in determining the success of your idea.
- Situations and circumstances will always change, so be flexible and adapt your idea accordingly.

### 6.6.2 Business Entity Concepts: Basic Business Terminology

If your aim is to start and run a business, it is crucial that you have a good understanding of basic business terms. Every entrepreneur should be well versed in the following terms:

- Accounting: A systematic method of recording and reporting financial transactions.
- Accounts payable: Money owed by a company to its creditors.
- Accounts Receivable: The amount a company is owed by its clients.
- Assets: The value of everything a company owns and uses to conduct its business.
- Balance Sheet: A snapshot of a company's assets, liabilities and owner's equity at a given moment.
- Bottom Line: The total amount a business has earned or lost at the end of a month.
- Business: An organization that operates with the aim of making a profit.
- Business to Business (B2B): A business that sells goods or services to another business.
- Business to Consumer (B2C): A business that sells goods or services directly to the end user.
- Capital: The money a business has in its accounts, assets and investments. The two main types of capital are debt and equity.
- Cash Flow: The overall movement of funds through a business each month, including income and expenses.
- Cash Flow Statement: A statement showing the money that entered and exited a business during a specific period of time.
- Contract: A formal agreement to do work for pay.
- Depreciation: The degrading value of an asset over time.
- Expense: The costs that a business incurs through its operations.
- Finance: The management and allocation of money and other assets.
- Financial Report: A comprehensive account of a business' transactions and expenses.
- Fixed Cost: A one-time expense.
- Income Statement (Profit and Loss Statement): Shows the profitability of a business during a period of time.
- Liabilities: The value of what a business owes to someone else.
- Marketing: The process of promoting, selling and distributing a product or service.
- Net Income/Profit: Revenues minus expenses.
- Net Worth: The total value of a business.
- Payback Period: The amount of time it takes to recover the initial investment of a business.
- Profit Margin: The ratio of profit, divided by revenue, displayed as a percentage.

- Return on Investment (ROI): The amount of money a business gets as return from an investment.
- Revenue: The total amount of income before expenses are subtracted.
- Sales Prospect: A potential customer.
- Supplier: A provider of supplies to a business.
- Target Market: A specific group of customers at which a company's products and services are aimed.
- Valuation: An estimate of the overall worth of the business.
- Variable Cost: Expenses that change in proportion to the activity of a business.
- Working Capital: Calculated as current assets minus current liabilities.
- Business Transactions: There are three types of business transactions. These are:
  - Simple Transactions Usually a single transaction between a vendor and a customer. For example: Buying a cup of coffee.
  - Complex Transactions These transactions go through a number of events before they can be completed. For example: Buying a house.
  - Ongoing transactions These transactions usually require a contract. For example: Contract with a vendor.

### **Basic Accounting Formulas**

Take a look at some important accounting formula that every entrepreneur needs to know.

1. **The Accounting Equation**: This is value of everything a company owns and uses to conduct its business.

Formula: Assets = Liability + Owner's Equity

2. **Net Income**: This is the profit of the company.

Formula: Net Income = Revenues – Expenses

3. **Break-Even Point**: This is the point at which the company will not make a profit or a loss. The total cost and total revenues are equal.

Formula: Break-Even = Fixed Costs/Sales Price – Variable Cost per Unit

4. **Cash Ratio**: This tells us about the liquidity of a company.

Formula: Cash Ratio = Cash/Current Liabilities

5. **Profit Margin:** This is shown as a percentage. It shows what percentage of sales are left over after all the expenses are paid by the business.

Formula: Profit Margin = Net Income/Sales

6. **Debt-to-Equity Ratio:** This ratio shows how much equity and debt a company is using to finance its assets, and whether the shareholder equity can fulfil obligations to creditors if the business starts making a loss.

Formula: Debt-to-Equity Ratio = Total Liabilities/Total Equity

7. **Cost of Goods Sold**: This is the total of all costs used to create a product or service, which has been sold.

Formula: Cost of Goods Sold = Cost of Materials/Inventory - Cost of Outputs

Return on Investment (ROI): This is usually shown as a percentage. It calculates the profits of an investment as a percentage of the original cost.

Formula: ROI = Net Profit/Total Investment \* 100

 Simple Interest: This is money you can earn by initially investing some money (the principal).

Formula:

A = P(1 + rt); R = r \* 100

Where:

A = Total Accrued Amount (principal + interest)

P = Principal Amount

I = Interest Amount

- r = Rate of Interest per year in decimal; r = R/100
- t = Time Period involved in months or years
- 10. **Annual Compound Interest**: The calculates the addition of interest to the principal sum of a loan or deposit.

Formula:

 $A = P (1 + r/n) ^ nt:$ 

Where:

- A = the future value of the investment/loan, including interest
- P = the principal investment amount (the initial deposit or loan amount)

r = the annual interest rate (decimal)

n = the number of times that interest is compounded per year

t = the number of years the money is invested or borrowed for

### 6.6.3 CRM & Networking: What is CRM?

CRM stands for Customer Relationship Management. Originally the expression Customer Relationship Management meant managing one's relationship with customers. However, today it refers to IT systems and software designed to help companies manage their relationships.

### The Need for CRM

The better a company can manage its relationships with its customers, the higher the chances of the company's success. For any entrepreneur, the ability to successfully retain existing customers and expand the enterprise is paramount. This is why IT systems that focus on addressing the problems of dealing with customers on a daily basis are becoming more and more in demand.

Customer needs change over time, and technology can make it easier to understand what customers really want. This insight helps companies to be more responsive to the needs of their customers. It enables them to modify their business operations when required, so that their customers are always served in the best manner possible. Simply put, CRM helps companies recognize the value of their clients and enables them to capitalize on improved customer relations.

### **Benefits of CRM**

CRM has a number of important benefits:

- It helps improve relations with existing customers which can lead to:
  - Increased sales

- Identification of customer needs
- Cross-selling of products
- It results in better marketing of one's products or services
- It results in better marketing of one's products or services
- It enhances customer satisfaction and retention
- It improves profitability by identifying and focusing on the most profitable customers ٠

### What is Networking?

In business, networking means leveraging your business and personal connections in order to bring in a regular supply of new business. This marketing method is effective as well as low cost. It is a great way to develop sales opportunities and contacts. Networking can be based on referrals and introductions, or can take place via phone, email, and social and business networking websites.

### The Need for Networking

Networking is an essential personal skill for business people, but it is even more important for entrepreneurs. The process of networking has its roots in relationship building. Networking results in greater communication and a stronger presence in the entrepreneurial ecosystem. This helps build strong relationships with other entrepreneurs. Business networking events held across the globe play a huge role in connecting like-minded entrepreneurs who share the same fundamental beliefs in communication, exchanging ideas and converting ideas into realities. Such networking events also play a crucial role in connecting entrepreneurs with potential investors. Entrepreneurs may have vastly different experiences and backgrounds but they all have a common goal in mind – they all seek connection, inspiration, advice, opportunities and mentors. Networking offers them a platform to do just that.

### **Benefits of Networking**

Networking offers numerous benefits for entrepreneurs. Some of the major benefits are:

- Getting high quality leads •
- Increased business opportunities
- Meeting positive and enthusiastic people
- Increased self-confidence Satisfaction from helping others •
- Advice from like-minded entrepreneurs •

•

Gaining visibility and raising your profile

Good source of relevant connections

Building strong and lasting friendships

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- Use social media interactions to identify needs and gather feedback.
- When networking, ask open-ended questions rather than yes/no type questions.

### 6.6.4 Business Plan: Why Set Goals?

Setting goals is important because it gives you long-term vision and short-term motivation. Goals can be short term, medium term and long term.

### Short-Term Goals

• These are specific goals for the immediate future.

**Example:** Repairing a machine that has failed.

### **Medium-Term Goals**

- These goals are built on your short-term goals.
- They do not need to be as specific as your short-term goals.

**Example:** Arranging for a service contract to ensure that your machines don't fail again.

### Long-Term Goals

These goals require time and planning. They usually take a year or more to achieve.

Example: Planning your expenses so you can buy new machinery

### Why Create a Business Plan?

A business plan is a tool for understanding how your business is put together. It can be used to monitor progress, foster accountable and control the fate of the business. It usually offers a 3-5year projection and outlines the plan that the company intends to follow to grow its revenues. A business plan is also a very important tool for getting the interest of key employees or future investors.

A business plan typically comprises of eight elements.

### **Executive Summary**

The executive summary follows the title page. The summary should clearly state your desires as the business owner in a short and business like way. It is an overview of your business and your plans. Ideally this should not be more than 1-2 pages. Your Executive Summary should include:

• The Mission Statement: Explain what your business is all about.

### **Example: Nike's Mission Statement**

Nike's mission statement is "To bring inspiration and innovation to every athlete in the world."

- Company Information: Provide information like when your business was formed, the names and roles of the founders, the number of employees, your business location(s) etc.
- Growth Highlights: Mention examples of company growth. Use graphs and charts where possible.
- Your Products/Services: Describe the products or services provided.
- Financial Information: Provide details on current bank and investors.
- Summarize future plans: Describe where you see your business in the future.

### **Business Description**

The second section of your business plan needs to provide a detailed review of the different elements of your business. This will help potential investors to correctly understand your business goal and the uniqueness of your offering.

Your Business Description should include:

- A description of the nature of your business
- The market needs that you are aiming to satisfy
- The ways in which your products and services meet these needs
- The specific consumers and organizations that you intend to serve
- Your specific competitive advantages

### Market Analysis

The market analysis section usually follows the business description. The aim of this section is to showcase your industry and market knowledge. This is also the section where you should lay down your research findings and conclusions.

Your Market Analysis should include:

- Your industry description and outlook
- The amount of market share you want to capture
- Information on your target market
- The needs and demographics of your target audience
- The size of your target market
- Your pricing structureYour competitive analysis
- Any regulatory requirements

### **Organization & Management**

This section should come immediately after the Market Analysis. Your Organization & Management section should include:

- Your company's organizational structure
- Detailed descriptions of each division/department and its function
- Details of your company's ownership
- The salary and benefits package that you offer your people
- Details of your management team
- Qualifications of your board of directors

### Service or Product Line

The next section is the service or product line section. This is where you describe your service or product, and stress on their benefits to potential and current customers. Explain in detail why your product of choice will fulfil the needs of your target audience. Your Service or Product Line section should include:

- A description of your product/service
- A description of your product or service's life cycle
- A list of any copyright or patent filings
- A description of any R&D activities that you are involved in or planning

### Marketing & Sales

Once the Service or Product Line section of your plan has been completed, you should start on the description of the marketing and sales management strategy for your business. Your Marketing section should include the following strategies:

- **Market penetration strategy:** This strategy focuses on selling your existing products or services in existing markets, in order to increase your market share.
- **Growth strategy:** This strategy focuses on increasing the amount of market share, even if it reduces earnings in the short-term.
- **Channels of distribution strategy:** These can be wholesalers, retailers, distributers and even the internet.
- **Communication strategy:** These can be written strategies (e-mail, text, chat), oral strategies (phone calls, video chats, face-to-face conversations), non-verbal strategies (body language, facial expressions, tone of voice) and visual strategies (signs, webpages, illustrations).

Your Sales section should include the following information:

- A salesforce strategy: This strategy focuses on increasing the revenue of the enterprise.
- A breakdown of your sales activities: This means detailing out how you intend to sell your products or services will you sell it offline or online, how many units do you intend to sell, what price do you plan to sell each unit at, etc.

### **Funding Request**

This section is specifically for those who require funding for their venture. The Funding Request section should include the following information:

- How much funding you currently require.
- How much funding you will require over the next five years. This will depend on your long-term goals.
- The type of funding you want and how you plan to use it. Do you want funding that can be used only for a specific purpose, or funding that can be used for any kind of requirement?
- Strategic plans for the future. This will involve detailing out your long-term plans what these plans are and how much money you will require to put these plans in motions.
- Historical and prospective financial information. This can be done by creating and maintaining all your financial records, right from the moment your enterprise started, to

the present day. Documents required for this are your balance sheet which contains details of your company's assets and liabilities, your income statement which lists your company's revenues, expenses and net income for the year, your tax returns (usually for the last three years) and your cash flow budget which lists the cash that came in, the cash that went out and states whether you had a cash deficit (negative balance) or surplus (positive balance) at the end of each month.

### Financial Planning



Before you begin building your enterprise, you need to plan your finances. Take a look at the steps for financial planning:

**Step 1:** Create a financial plan. This should include your goals, strategies and timelines for accomplishing these goals.

**Step 2:** Organize all your important financial documents. Maintain a file to hold your investment details, bank statements, tax papers, credit card bills, insurance papers and any other financial records.

**Step 3:** Calculate your net worth. This means figure out what you own (assets like your house, bank accounts, investments etc.), and then subtract what you owe (liabilities like loans, pending credit card amounts etc.) the amount you are left with is your net worth.

**Step 4:** Make a spending plan. This means write down in detail where your money will come from, and where it will go.

**Step 5:** Build an emergency fund. A good emergency fund contains enough money to cover at least 6 months' worth of expenses.

**Step 6:** Set up your insurance. Insurance provides long term financial security and protects you against risk.

### **Risk Management**

As an entrepreneur, it is critical that you evaluate the risks involved with the type of enterprise that you want to start, before you begin setting up your company. Once you have identified potential risks, you can take steps to reduce them. Some ways to manage risks are:

- Research similar business and find out about their risks and how they were minimized.
- Evaluate current market trends and find out if similar products or services that launched a while ago are still being well received by the public.
- Think about whether you really have the required expertise to launch your product or service.
- Examine your finances and see if you have enough income to start your enterprise.
- Be aware of the current state of the economy, consider how the economy may change over time, and think about how your enterprise will be affected by any of those changes.
- Create a detailed business plan.

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Ensure all the important elements are covered in your plan.

Scrutinize the numbers thoroughly.

Be conservative in your approach and your projections.

Use visuals like charts, graphs and images wherever possible.

Be concise and realistic.

### 6.6.5 Procedure and Formalities for Bank Finance: The Need for Bank Finance

For entrepreneurs, one of the most difficult challenges faced involves securing funds for start-ups. With numerous funding options available, entrepreneurs need to take a close look at which funding methodology works best for them. In India, banks are one of the largest funders of start-ups, offering funding to thousands of start-ups every year.

### What Information Should Entrepreneurs Offer Banks for Funding?

When approaching a bank, entrepreneurs must have a clear idea of the different criteria that banks use to screen, rate and process loan applications. Entrepreneurs must also be aware of the importance of providing banks with accurate and correct information. It is now easier than ever for financial institutions to track any default behaviour of loan applicants. Entrepreneurs looking for funding from banks must provide banks with information relating to their general credentials, financial situation and guarantees or collaterals that can be offered.

### **General Credentials**

This is where you, as an entrepreneur, provide the bank with background information on yourself. Such information includes:

- Letter(s) of Introduction: This letter should be written by a respected business person who knows you well enough to introduce you. The aim of this letter is set across your achievements and vouch for your character and integrity.
- Your Profile: This is basically your resume. You need to give the bank a good idea of your educational achievements, professional training, qualifications, employment record and achievements.
- Business Brochure: A business brochure typically provides information on company products, clients, how long the business has been running for etc.
- Bank and Other References: If you have an account with another bank, providing those bank references is a good idea.
- Proof of Company Ownership or Registration: In some cases, you may need to provide the bank with proof of company ownership and registration. A list of assets and liabilities may also be required.

### **Financial Situation**

Banks will expect current financial information on your enterprise. The standard financial reports you should be prepared with are:

Balance Sheet

- Profit-and-Loss Account
- Cash-Flow Statement

Projected Sales and Revenues

Business Plan

• Feasibility Study

### **Guarantees or Collaterals**

Usually banks will refuse to grant you a loan without security. You can offer assets which the bank can seize and sell off if you do not repay the loan. Fixed assets like machinery, equipment, vehicles etc. are also considered to be security for loans.

### The Lending Criteria of Banks

Your request for funding will have a higher chance of success if you can satisfy the following lending criteria:

- Good cash flow
- Adequate security

- Adequate shareholders' funds
- Experience in business





To apply for funding the following procedure will need to be followed.

- 1. Submit your application form and all other required documents to the bank.
- 2. The bank will carefully assess your credit worthiness and assign ratings by analysing your business information with respect to parameters like management, financial, operational and industry information as well as past loan performance.
- 3. The bank will make a decision as to whether or not you should be given funding.

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- Get advice on funding options from experienced bankers.
- Be cautious and avoid borrowing more than you need, for longer than you need, at an interest rate that is higher than you are comfortable with.

## 6.6.6 Enterprise Management - An Overview: How to Manage

Your Enterprise?

To manage your enterprise effectively you need to look at many different aspects, right from managing the day-to-day activities to figuring out how to handle a large-scale event. Let's take a look at some simple steps to manage your company effectively.

### Step 1: Use your leadership skills and ask for advice when required.

Let's take the example of Ramu, an entrepreneur who has recently started his own enterprise. Ramu has good leadership skills – he is honest, communicates well, knows how to delegate work etc. These leadership skills definitely help Ramu in the management of his enterprise. However, sometimes Ramu comes across situations that he is unsure how to handle. What should Ramu do in this case? One solution is for him to find a more experienced manager who is willing to mentor him. Another solution is for Ramu to use his networking skills so that he can connect with managers from other organizations, who can give him advice on how to handle such situations.

## Step 2: Divide your work amongst others – realize that you cannot handle everything yourself.

Even the most skilled manager in the world will not be able to manage every single task that an enterprise will demand of him. A smart manager needs to realize that the key to managing his enterprise lies in his dividing all his work between those around him. This is known as delegation. However, delegating is not enough. A manager must delegate effectively if he wants to see results. This is important because delegating, when done incorrectly, can result in you creating even more work for yourself. To delegate effectively, you can start by making two lists. One list should contain the things that you know you need to handle yourself. The second list should contain the things that you are confident can be given to others to manage and handle. Besides incorrect delegation, another issue that may arise is over-delegation. This means giving away too many of your tasks to others. The problem with this is, the more tasks you delegate, the more time you will spend tracking and monitoring the work progress of those you have handed the tasks to. This will leave you with very little time to finish your own work.

### Step 3: Hire the right people for the job.

Hiring the right people goes a long way towards effectively managing your enterprise. To hire the best people suited for the job, you need to be very careful with your interview process. You should ask potential candidates the right questions and evaluate their answers carefully. Carrying out background checks is always a good practice. Running a credit check is also a good idea, especially if the people you are planning to hire will be handling your money. Create a detailed job description for each role that you want filled and ensure that all candidates have a clear and correct understanding of the job description. You should also have an employee manual in place, where you put down every expectation that you have from your employees. All these actions will help ensure that the right people are approached for running your enterprise.

### Step 4: Motivate your employees and train them well.

Your enterprise can only be managed effectively if your employees are motivated to work hard for your enterprise. Part of being motivated involves your employees believing in the vision and mission of your enterprise and genuinely wanting to make efforts towards pursuing the same. You can motivate your employees with recognition, bonuses and rewards for achievements. You can also motivate them by telling them about how their efforts have led to the company's success. This will help them feel pride and give them a sense of responsibility that will increase their motivation. Besides motivating your people, your employees should be constantly trained in new practices and technologies. Remember, training is not a one-time effort. It is a consistent effort that needs to be carried out regularly.

### Step 5: Train your people to handle your customers well.

Your employees need to be well-versed in the art of customer management. This means they should be able to understand what their customers want, and also know how to satisfy their needs. For them to truly understand this, they need to see how you deal effectively with customers.

This is called leading by example. Show them how you sincerely listen to your clients and the efforts that you put into understand their requirements. Let them listen to the type of questions that you ask your clients so they understand which questions are appropriate.

### Step 6: Market your enterprise effectively.

Also, hire a marketing agency if you feel you need help in this area. Now that you know what is required to run your enterprise effectively, put these steps into play, and see how much easier managing your enterprise becomes!

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- Get advice on funding options from experienced bankers.
- Be cautious and avoid borrowing more than you need, for longer than you need, at an interest rate that is higher than you are comfortable with.

### 6.6.7 20 Questions to Ask Yourself Before Considering

### Entrepreneurship

- 1. Why am I starting a business?
- 2. What problem am I solving?
- 3. Have others attempted to solve this problem before? Did they succeed or fail?
- 4. Do I have a mentor or industry expert that I can call on?
- 5. Who is my ideal customer?
- 6. Who are my competitors?
- 7. What makes my business idea different from other business ideas?
- 8. What are the key features of my product or service?
- 9. Have I done a SWOT analysis?
- 10. What is the size of the market that will buy my product or service?

- 11. What would it take to build a minimum viable product to test the market?
- 12. How much money do I need to get started?
- 13. Will I need to get a loan?
- 14. How soon will my products or services be available?
- 15. When will I break even or make a profit?
- 16. How will those who invest in my idea make a profit?
- 17. How should I set up the legal structure of my business?
- 18. What taxes will I need to pay?
- 19. What kind of insurance will I need?
- 20. Have I reached out to potential customers for feedback?

- It is very important to validate your business ideas before you invest significant time, money and resources into it.
- The more questions you ask yourself, the more prepared you will be to handle to highs and lows of starting an enterprise.

### Footnotes:

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- 1. A mentor is a trusted and experienced person who is willing to coach and guide you.
- 2. A customer is someone who buys goods and/or services.
- 3. A competitor is a person or company that sells products and/or services similar to your products and/or services.
- 4. SWOT stands for Strengths, Weaknesses, Opportunities and Threats. To conduct a SWOT analysis of your company, you need to list down all the strengths and weaknesses of your company, the opportunities that are present for your company and the threats faced by your company.
- 5. A minimum viable product is a product that has the fewest possible features, that can be sold to customers, for the purpose of getting feedback from customers on the product.
- 6. A company is said to break even when the profits of the company are equal to the costs.
- 7. The legal structure could be a sole proprietorship, partnership or limited liability partnership.
- 8. There are two types of taxes direct taxes payable by a person or a company, or indirect taxes charged on goods and/or services.
- 9. There are two types of insurance life insurance and general insurance. Life insurance overs human.
- life while general insurance covers assets like animals, goods, cars etc



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