





Transforming the skill landscape



Sector Electronics

Sub-Sector Consumer Electronics

Occupation
After Sales Service

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NSQF Level : 4

TV Repair Technician

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Skilling is building a bett er India. If we have to move India towards development then Skill Development should be our mission.

Shri Narendra Modi Prime Minister of India



Acknowledgement -

- 1. Standard books on Electricity, Electronics and Television Technology
- 2. Own experience and learning in the Television Industry
- 3. Own Skills

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4. Websites

About this Guide

Skill India is a mission to skill the youth of India so that they are suitably employed and help to carry our great nation forward. This guide aims to upgrade skills of Television technicians and engineers, supervi-sors and managers working in organized or unorganized sectors in After Sales service, production or quality control and can be used as a guide book.

This guide has been especially written as per QP ELE/Q3101 and as per NOS prepared by ESSCI and NSDC under Ministry of Skill Development and Entrepreneurship.

Having worked in the Consumer Electronics field since long, I am aware of the difficulties faced by the training facilitators and technicians. So, Basic Electronics has been explained in a simple and easy to understand language. This guide has been divided into chapters. We take up the concepts of Physics, Basics of Electricity, Semi Conductors. We then take the student through signal transmission and recep-tion.

After going through these chapters, one can easily understand working principles of TV and LCD / LED TVs, their installation and demonstration and finally their trouble shooting.

As per QP, we have also included chapters on Soft Skills and Communication Skills as in today's compet-itive environment, soft skills play a major role in After Sales Service.

As per QP, more emphasis in this guide is on practical learning and doing along with the theory. We strongly warn that no attempt should be made by any one to try repair of any CRT or LCD / LED TV or any electronic gadget only by reading this book. This is only a guide book and the student should try repair only after doing a certified course from any authorized Training Partner with NSDC or any other certified Training Agency and under the watchful supervision of a certified Trainer

Author



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1. Introduction

Unit 1.1 - Introduction to the course Unit1.2 - What you will learn



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- Key Learning Outcomes 🎑

At the end of this module, you will be able to:

- 1. Explain scope of the course
- 2. Explain expected outcome from the course

UNIT 1.1: Introduction to the course



At the end of this unit, students will be able to:

1. Explain scope of the course

Do 🗹

- Split the participant's into groups of 2 each.
- Each group will spend 10 minutes to get to know maximum about his partner
- All groups will gather back

Say

- This is first time in the history of India that we are having an independent ministry for skill develop ment & entrepreneurship
- In addition to his thrust on the "Make in India" initiative, our Prime Minister is giving equal emphasis on "Skill India" initiatives
- Only " Make in India " will not succeed, unless it is coupled with " Skill India "
- Skilled people only can deliver good products and services



- Ask the participants, whether they want to be skilled technicians
- Ask them to narrate skills required for efficient and effective TV Repair Technician

Demonstrate



- Demonstrate a day in life of a TV Repair Technician in the workshop during practicals
- Let them get acquainted with workshop environment

Notes for Facilitation

• Explain scope of the course :

This facilitator guide is designed as a standalone reference manual for training facilitators and techni-cians working in the Television industry. It begins with basics of electrical and electronics theory and ends up in giving a overview and repairing techniques of CRT and Flat panel based Television system with the safety guidelines. As the industry is increasingly finding that Soft Skills and Communication skills are also very important along with hard skills, these have also been covered in this book. Tips on how to troubleshoot common problems are also provided. These lessons are primarily text-based with some illustrations. This guide may be used either on its own or as an integral part of a classroom course including practical work to enable the facilitators and students to progress to assessment and certifica-tion. We hope you and your career benefit greatly from this guide and associated training course.

UNIT 1.1: What you will learn



At the end of this unit, students will be able to:

1. Explain what should be expected for the course

• Do " Role Play " with one of the participant playing the role of a customer and another participant playing the role of a TV repair technician



Do

- Ask the participants to recapitulate the learnings from earlier sessions
- Ask them whether they are prepared to go ahead and learn new skills required to be a successful TV repair technician

Demonstrate

 Demonstrate the use of various service tools necessary for TV repairs during practicals in the service station

Notes for Facilitation

- Let the participants get mentally prepared for the training course
- Explain them what is stored in future for them after successfully completing the course
- Explain them that theywill learn after going through this course:
- 1. Basic Electronics-Working of resistance, inductance, capacitance, diode, transistors, FET and MOSFET
- 2. Understand theory behind Television working.
- 3. Installation of Television at appropriate location
- 4. Servicing or Faultfinding and repair of CRT and Flat panel Television system
- 5. Understanding the safety requirements before installing
- 6. Interact with Customer in a friendly way-Soft and communication Skills
- 7. Interacting with superiors and understanding the company policies- Soft Skills and Communication Skills

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2. Basics of Electrical and Electronics Theory

- Unit 2.1 Fundamentals of Electricity
- Unit 2.2 Current, Voltage and Power
- Unit 2.3 Circuits in Series and Parallel
- Unit 2.4 Ohm's Law, Kirchoff's Law
- Unit 2.5 Passive and Active Devices
- Unit 2.6 Passive Devices- Resistors, Capacitors, Inductors Unit
- Unit 2.7 Active Devices Diodes, Zeners, Transistors and Integrated Circuits,
 - CRT, LED or LCD display Unit
- 2.8 Know your Tools



- Key Learning Outcomes

At the end of this module, you will be able to:

- 1. Explain fundamentals of electricity
- 2. Explain series and parallel circuit
- 3. Calculate resistance, voltage and current in series and parallel circuit
- 4. Describe Ohm's and Kirchoff's law and understand its application
- 5. Explain various types of active components and its application
- 6. Explain various types of passive components and its application
- 7. Identify and Operate various tools and equipments

UNIT 1.1: Fundamentals of Electricity



At the end of this unit, students will be able to:

- 1. Describe electricity
- 2. Explain how electricity works



Ask 🥯

- Numeric illustrations on ohm's law
- Numeric illustrations on Kirchoff's law

• Ask the participants to recapitulate learning from earlier session

- Ask them to describe ohm's law
- Ask them to describe Kirchoff's law



- Series connections during practicals
- Parallel connections during practicals



- Electronics is ever expanding frontiers of science and its applications in service of the human beings
- Advances in the field of Television is offering best uses to customers in the form of LCD, LED, Plasma,
 - DTH : Direct to Home vis satellite communications

Notes for Facilitation

- Electricity & electronics have entered into our multiple activities every day
- Without electricity & electronics we will be hardly able to perform our daily chorus of activities

What is electricity:

Electricity is the flow of moving electrons. When the electrons flow it is called an electrical current. To understand why electrons flow you need to understand that atoms can lose electrons by rubbing against another material.

How does the electricity work:

A current of electricity is a steady flow of electrons. When electrons move from one place to another, round a circuit, they carry electrical energy from place to place like marching ants carrying leaves. Instead of carrying leaves, electrons carry a tiny amount of electric charge

How many electrons will flow in 1 amp?

Current flows from negatively charged material to positively charged material and is essentially the number of electrons per second that are carried through a conductor. Current is measured in units of amps. 1 amp = 1 coloumb/sec = 6.2×1018 electrons per second

UNIT 2.2: Current Voltage and Power



At the end of this unit, students will be able to:

- 1. Explain what is current, voltage and power
- 2. Explain series and parallel circuit



- Numeric calculations on current, voltage, power consumption
- Ask

Do

- Ask the participants to recapitulate learnings from earlier sessions
- Ask them to describe the units of measurement of current, voltage, power

Demonstrate

- Demonstrate series connections in electric circuits during practicals
- Demonstrate parallel connections in electrical circuits during practicals



- Usage of electricity is charged to the customers based on units of power consumed
- Rates of charges for electricity consumed varies with the power supplier company and also the type of customer like personal or industrial

Notes for Facilitation

- State electricity boards are entrusted with responsibility of generation, distribution and maintenance of electric power supply
- Electricity works wonders for mankind

2.2.1: Current, Voltage and Power

- Electricity is the flow of electric charge. We can describe the flow of electric charge in several ways. These include the quantities Current, Voltage and Power.
- Current (I) is the rate of flow of Charge, such as electrons. Current is usually thought of as moving in the direction of positive charge, so from the positive power supply to the negative. However, since in metals it is electrons that carry electric charge, the actual flow is opposite to the way in which we think of it.
 I=dq/dt
- Current: It is the amount of Charge, Q that passes a point in a set time, t. So, we say it is the rate of flow of charge. Current is measured in Amps (A), and charge is measured in Coulombs (C).
- Voltage (V) or Potential Difference (P.D.) is a measure of the Energytransferred per Charge Carrier between two points.
 V=E/Q
- Voltage is the Energy E per Charge Q. Voltage is measured in Volts (V), which is defined as one Joule per Coulomb. Voltage can be defined in base units as Kgm2s-3A-1.
- Power (P) is the rate of Energy transfer. It is measured in watts (W), where one watt is defined as one Joule per Second. Hence watts can be expressed in base units as Kgm2s-3 Power P=Energy/Time 1W=1 Joule/Second
- From this definition of Power, we can substitute the algebraic definitionsabove to produce a variety of other formulae, including 'Power = Current × Voltage' P=I*V
- Ohm's Law states that " Current flowing in a conductor is directly proportional to the voltage applied across the conductor subject to following conditions
 - 1. Temperature remains constant
 - 2. This equation applies to both Alternating and direct Currents
 - 3. It does not apply to certain semiconductors like Tunnel diode which works on Negative Resistance.
 - It is written as : Vα I
 - When we remove the proportional sign, we get,
 - V=I*R
 - Voltage = Current × Resistance'. R is a constant.
 - Here V is in Volts
 - I is in Amperes
 - R is in Ohms

Power: Its equation is : P=V*I

- We can also write above equation as
- P=I*R*I
- Or P =I*I*R=I²R
- We use this equation to find out power losses like :Heat losses in a circuit. We can also write this equationas

P=(V²/R²)*R=V²/R Example 1: Find Resistance when V=220 Volts, I=2 Amperes Solution 1: R=V/I =220/2=110 Ohms Example 2: Find Heat Loss in a light bulb where V=220V, I= 0.25 Amperes Solution: Heat Loss=V*I=220*0.25=220*(¼)=55W

UNIT 2.3: Circuits in Series and Parellal



At the end of this unit you will be able to:

1. Calculate resistance and voltage in series and parallel circuit

Do 🗸

- Let the participants do numeric illustrations on series connections
- Let the participants do numeric illustrations on parallel connections

Ask 🥯

- Ask the participants to recapitulate learnings from earlier sessions
- Ask them difference in series & parallel connections

Demonstrate

- Demonstrate series connections during practicals
- Demonstrate parallel connections during practicals

Notes for Facilitation

- Describe common conventions, symbols used in electric circuit diagrams
- Explain the use of fuse & MCBs, Miniature circuit breakers

2.3.1: Resistance in Series

Resistance in Series:

R=R1+R2+R3+------Where R1, R2, R3 are connected in Series Example: R1 is 10 Ohms, R2 is 100 Ohms and R3 is 1000 Ohms R=10+100+1000=1110 Ohms or 1.11K



Fig: 2.3.1.1 Resistance in Series

Resistance in Parallel:

1/R=1/R1+1/R2+1/R3+------

Example:

R1 is 100 Ohms and R2 is also 100 Ohms

I/R=1/100+1/100=2/100=1/50

So R=50 Ohms



Fig: 2.3.1.2 Resistance in Parallel

Voltage in Series:

- The total voltage of several voltage sources or voltage drops in series is their sum.
- VT = V1 + V2 + V3 +...
- VT the equivalent voltage source or voltage drop in volts (V).
- V1 voltage source or voltage drop in volts (V).
- V2 voltage source or voltage drop in volts (V).
- V3 voltage source or voltage drop in volts (V).

Voltage in Parallel:

- Voltage sources or voltage drops in parallel have equal voltage.
- VT = V1 = V2 = V3 =...
- VT the equivalent voltage source or voltage drop in volts (V).
- V1 voltage source or voltage drop in volts (V).
- V2 voltage source or voltage drop in volts (V).
- V3 voltage source or voltage drop in volts (V).
- For electrical circuit with resistors (or other impedance) in series, the voltage drop Vi on resistor Ri is:
- Vi=Vt.Ri / (Ri+Rj+Rk), where Ri, Rj and Rk are three resistances in series in a circuit and Vt is the Total Voltage in the circuit.

Example:

- If Vt=12 V
- Ri=2 Ohm
- Rj=40hm
- Rk=6 Ohm
- Then Vi=(12*2)/ 12=2 Volts
- Vj=(12*4)/ 12=4 Volts
- Vk=12*6/12=6 Volts

UNIT 2.4: Ohms' Law and Kirchoff's Law



At the end of this unit you will be able to:

- 1. Explain Ohms law and its application in calculating Voltage, Resistance and Current
- 2. Explain Kirchoff's current law (KCL)
- 3. Explain Kirchoff's voltage law (KVL)

- Do 🗸

• Show them samples of various fuses

• Show them samples of circuit breakers

Ask 🦳

- Ask the participants to recapitulate learnings from earlier sessions
- Ask them to describe the Ohm's law
- Ask them to describe the KIrchoff's law

Demonstrate

- Demonstrate the use of fuse in electric circuits during practicals
- Demonstrate the use of circuit breakers during practicals

Notes for Facilitation

- Circuit diagrams should show the different constituents of the circuit very clearly
- Ohm's law and Kirchoff's law are the main laws governing electric circuits

2.4.1: Ohm's Law

GS Ohm discovered a law which tells us the relation between Voltage and current in a conductor. It applies equally to AC and DC subject to certain limitations.

It states that if there is a conductor with a potential difference of V Volts between its two terminals and a current I Amperes flows in the conductor, then the current is directly proportional to the potential differ-ence and is shown as :

 $V\alpha I$, subject to the condition that temperature remains constant . Thus V=I*R

Where R is a constant and is called Resistance and is depicted by "R". Its SI unit is Ohm while current I is in Ampere and potential difference V is in Volts.

resistance increases with increase in temperature such that Rt=R0($1+\alpha t$).

Example:

If Voltage=220 Volts and Current is 2 Amperes, Resistance R is R=V/I

R=220/2=110 Ohms

The other limitation to this law is that this law does not apply to certain semi conductors which show negative resistance charcterstics

2.4.2: Direct and Alternating Currents

Current is also defined as Rate of flow of charge. It can be shown as I=Q/T Or di=dq/dt If the current flows in one direction only, it is called Direct Current. We get it from DC Generators, cells,

batteries or we rectify AC to get DC and use in Electronic Circuits.

Ask 🧕

• Ask the participants too recapitulate learnings from earlier sessions

- Ask them to differentiate AC & DC
- Ask them the function of rectifier
- Ask them the function of batteries



- Show them samples of rectifier, batteries, Generator sets
- Show single phase & three phase supply

Demonstrate

- Use of Gen set, rectifier, battery during practicals
- Use of circuit breakers, fuses during practicals

2.4.3: Alterating Current

It is so called because in it flow of electrons changes directions.



Fig: 2.4.3.1 Alterating Current

Kirchoffs Laws:

Current Law (KCL)

The total current entering a junction will be equal to the total current leaving the junction. So, the algebra-ic

sum of all currents entering and leaving a node must be equal to zero, I outgoing +I incoming=0.



Fig: 2.4.3.2 Current Law (KCL)

It can be read as :

Total current entering a junction=Total current leaving a junction



UNIT 2.5: Passive and Active Devices



At the end of this unit you will be able to:

- 1. Explain concept of Active components
- 2. Explain concept of passive components

Do

- Show them some active device samples
- Show them some passive device samples

Ask

- Ask the participants what is passive
- Ask the participants what is active
- Ask them to give some examples of active
- Ask them to give some examples of passive

Demonstrate

- Demonstrate active devices during practicals
- Demonstrate passive devices during practicals

Notes for Facilitation

- Active and passive voice are commonly used in english
- Similarly, there are active and passive devices in electric circuits

2.5.1: Passsive Devices -

Passive devices are those devices or components which do not require external source for their operation.

Example:

For example, a Diode needs 0.3 Or 0.7 V to operate but resistances do not require any such voltage for operation. I.e., when we connect a resistor to the supply voltage, it starts work without any specific voltage. So, these are components which store or maintain energy in the form of Voltage or Current. Active Components:

These devices or components require external source for their operation and these are called Active Components.

For Example: Diode, Transistors, SCR, IC, FET, MOSFET etc.

Example: As we know that Diode is an Active Component, so it requires an External Voltage for its opera-tion.

The reason is that If we connect a Diode in a Circuit and then connect this circuit to the Supply voltage., then Diode will conduct the current only if the supply voltageis 0.3 V (In case of Germanium) or 0.7V(In case of Silicon). So, Active Components are :

Those devices or components which produce energy in the form of Voltage or Current are called as Active Components.

UNIT 2.6: Passive Devices-Resistor, Capacitor, Inductor

- Unit Objectives 🮯

At the end of this unit you will be able to:

- 1. Explain concept of resister, capacitor and inductors
- 2. Calculate resistance of resister based on colour coding
- 3. Calculate inductance in series and parallel circuit
- 4. Calculate capacitance in series and parallel circuit
- 5. Explain various types of capacitor and its application
- Do
- Show them samples of resistor with colour codes for easy understanding
- Show them samples of capacitors, inductors
- Let them do numeric calculations on inductance in series and parallel
- Let them do numeric calculations on capacitance in series and parallel



- Ask the participants to recapitulate learnings from earlier sessions
- Ask them to recall colour coding system of resistors

Demonstrate

- Demonstrate capacitance in series and parallel during practicals
- Demonstrate inductance in series and parallel during practicals

Notes for Facilitation

- Recap on electrical circuits
- Colour coding system of resistors
- BB ROY of Great Britain had a Very Good Wife

– 2.6.1: Resistor or Resistance: ——

Resistor or Resistance:

The resistance may be available from 1 Ohm or even less to several Meg Ohms. It is therefore important to have a code so that by seeing the code a technician may be able to find the value of the resistor. We have here given a Table for these codes:

Resistance Codes:

Colour First Letter	Colour	Code
В	Black	0
В	Brown	1
R	Red	2
0	Orange	3
Υ	Yellow	4
G	Green	5
В	Blue	6
V	Violet	7
G	Grey	8
w	White	9

Tab: 2.6.1 Resistance Codes

The method to memorise the code is "BB ROY of Great Britain had a Very Good Wife." If there are 5 bands on the resistor, its value can be found as follows:

Ist colour band from left: Value to be taken from the above table.

2nd colour band from left :Value to be taken from above table.

3rd colour band from left :Value to be taken from the above

table. 4th colour band from left: is the Multiplier (10 to the

power) 5th colour band : It is for Tolerance as under: Silver 5%

Gold 10%

No colour or body colour 20%



Fig: 2.6.1.1 Resistor Colour Code

Examples:

Example #1



A resistor colored Yellow-Violet-Orange-Gold would be 47 k Ω with a tolerance of +/- 5%.

Example #2



A resistor colored Green-Red-Gold-Silver would be 5.2 Ω with a tolerance of +/- 10%.

Example #3



A resistor colored White-Violet-Black would be 97 Ω with a tolerance of +/- 20%. When you see only three color bands on a resistor, you know that it is actually a 4-band code with a blank (20%) tolerance band.



A resistor colored Blue-Brown-Green-Silver-Blue would be 6.15 Ω with a tolerance of +/- 0.25%.

Thus, knowledge of colour code helps us in finding the value of the resistance and it is very useful in TV repair.

Domestic Wiring:

In a series circuit, if one component is open, the circuit breaks and there is no current flow. It is because in Series, same current flows while in Parallel, there are branches and so current is divided while Voltage remains same.

This principle is used in Domestic wiring. The wiring is done in Series so that if one appliance becomes defective (open circuit) because of any reason, the current in other house hold appliances is not interrupted.

Inductance:

Inductance is the characteristic of a device which resists change in the current through the device. Induc-tors work on the principle that when a current flows in a coil of wire, a magnetic field is produced, which collapses when the current is stopped. The collapsing magnetic field produces an electromotive force which tries to maintain the current. When the coil current is switched, the induced EMF would be produced in such a direction, so as to oppose the build-up of the current. The unit of inductance is Henry. An inductance of one Henry will induce a counter emf (electromotive force) of one volt when the current through it is changing at the rate of one ampere per second. Inductances of several Henries are used in power supplies as smoothing chokes, whereas smaller values (in the milli-or micro- Henry ranges) are used in audio and radio frequency circuits.

It is a coil. The symbol is L and unit is Henry. But as this unit is very large for practical purposes, we use Milli and Micro Henry.

Coil in Series: If L1 and L2 are connected in series the equivalent inductance L is given as:



Fig: 2.6.1.2 Colour Coding

L=L1+L2

Coil in Parallel: If L1 and L2 are in parallel, L is given as

1/L=I/L1+1/L2



Fig: 2.6.1.3 Inductor Package

Capacitance:

A capacitor, like a resistor, is also a passive component, which can be used to store electrical charge.

Capacitors find applications in electrical and electronics fields as:

- Ripple filters in power supplies;
- Tuning resonant circuits, oscillator circuits;
- Timing elements in multi-vibrators, delay circuits;
- Coupling in amplifiers;
- De-coupling in power supplies and amplifiers; and
- Spark suppression on contacts on thermostats and relays.



Fig: 2.6.1.4 Capacitor color code

A capacitor (also called a 'condenser') consists of two facing conductive plates called electrodes, which are separated by a dielectric or insulator. The dielectric can be made of paper, mica, ceramic, plastic film or foil. To make a practical capacitor, a lead is connected to each plate or electrode. The charge Q which can be stored in a capacitor, when connected to a voltage V across it, is given by: Q = CV

A capacitor has two conductors separated by an insulator. The conductors can be charged by conecting them to the two terminails of a cell or battery. If Q is the charge on one of the conductors (total cahrge being zero), Electric field in region between conductors is directly proportional to the charge Q. The relation is:
QαC

Or Q=CV

Or C=Q/V

Where C is a Constant and its unit is Farad. Unit of Charge Q is Coloumb and unit of Voltage V is Volts. Capacity C depends on the shape, size and distance of the two conductors. It also depends on the insula-tor or di electric used to separate the two conductors. Capacitors are very important in Electronics and depending on application various types of capacitors like Electrolytic, Paper etc are used

Types:

1. Polarised eg Electrolytic

2. Non Polarised eg ceramic, polyester, mica, teflon



Fig: 2.6.1.5 Polarised Capacitor



Fig: 2.6.1.6 Non Polarised Capacitor





Fig: 2.6.1.7 Overlapping Applications of Capacitor Types



Fig: 2.6.1.8 Circuit Symbols



Fig: 2.6.1.9 SMD Capacitor

When in Parallel:

C=C1+C2

When in Series:

1/C=1/C1+1/C2

Its unit is Farad. But this being very large, smaller unit Micro Farad is used and its symbol is MF or μF

UNIT 2.7: Active devices: - Diodes, Zeners, Transistors and Integrated Circuits, CRT, LED or LCD display

- Unit Objectives 🧖

At the end of this unit you will be able to:

- 1. Explain concept of Diodes, Transistors, Integrated Circuits, CRT, LED and LCD
- 2. Explain various types of diodes their symbol and application
- 3. Explain various types of Transistors and its application
- 4. Explain various types of integrated circuit and its characteristics
- Do
- Show them some interesting, educative program on TV
- Have lively discussion on pros and cons of the TV program
- Show them differences in FPD, LCD, LED TV
- Show them samples of ICs

Ask 🦳

- Ask the participants to recapitulate learnings from earlier sessions
- Ask them which channels like the most on TV
- Ask them which serials like the most on TV
- Ask them about TRP of the programs
- Ask them whether TV needs a voltage stabiliser

Demonstrate

- Demonstrate use of Diodes, Transistors, Integrated Circuits, CRT, LED and LCD during practicals
- Demonstrate use of service tools for TV repairs
- Demonstrate use of measuring equipment for current, voltage and power

Notes for Facilitation

- Active and passive devices are both important in electrical circuits
- TV penetration even in rural areas is constantly on the rise
- TV viewership is also on the rise in both urban and rural areas

2.7.1: Active Devices: -

Active Devices:

There are some elements which are insulators but when they are doped with some impurity, they start showing conduction. So, they are called Semi Conductors and these semiconductors have propelled the growth of Electronics. Eg Silicon, Germanium etc. When they are doped, there is excess of electrons or holes due to which conduction takes place. The characteristics of some semiconductors are shown in following table:

Semiconductor	Junction	Electron mobility	Hole mobility	Max junction
	forward voltage	m/s@25degree C		temp. degree C
			m/s @25 degree	
			С	
Ge	0.27	0.39	0.19	70 to 100
Si	0.71	0.14	0.05	150 to 200
GeAs	1.03	0.85	0.05	150 to 200
Al-Si junction	0.3			150 to 200

Tab: 2.7.1 Resistance Codes

Active Components:

These alter the behavior in a circuit eg they can rectify, detect, amplify a signal. Diode, Transistor, Integrat-ed Circuits, FET and MOSFET are examples of Active Components.

Diode:

It is a one-way valve. It allows current in one direction only. These diodes are made from semiconductors like germanium, silicon etc. Many electronic devices are made using Si and Ge. The most basic device is diode. It is a two terminal P-N junction device. P-N junction is formed by bringing a P type material in contact with N type material. When a P-type material is brought in contact with N-type material electrons and holes start recombining near the junction. Due to this no charge carriers are left at the junction which is called depletion region



Fig: 2.7.1.1 Diode

Diode can operate as:

Forward Biased :



Fig: 2.7.1.2 Diode Operate Forward Biased

Here it allows current. Forward Voltage for Si is 0.7V and for Ge it is 0.3 V. In Si diodes there is a dark band on one corner which means it is cathode and the other side is anode.



Reverse Biased:

It does not allow current. In silicon diode the dark band in a corner indicates the cathode terminal and the other terminal is anode. Generally diodes are used as reverse polarity protector and transient protector. Some of the diodes are as under

1. Small Signal Diode:

It is used in high frequency and very low current applications like as in radios and televisions etc. Cathode terminal edge is marked with black or red color. Current and power are very low. Maximum is nearly 150mA and 500mW.

2. Large Signal Diode:

This has large PN junction layer. It is mainly used in battery charging devices like inverters. In these diode's forward resistance is in Ohms and the reverse blocking resistance is in mega Ohms. Since it has high current and voltage performance it is used to suppress high peak voltages.

3. Zener Diode:

Zener diode is just like an ordinary PN junction diode but operated in reverse biased condition. But ordinary PN junction diode connected in reverse biased condition is not used as Zener diode practically. A Zener diode is a specially designed, highly doped PN junction diode.



Fig: 2.7.1.4 Zener Diode

Shown above is a PN diode connected in Reverse Bias.



Fig: 2.7.1.5 Diode in Reverse Bias

When a zener diode is connected across a voltage source, and the source voltage is more than zener voltage, the voltage across a zener diode remains fixed irrespective of the source voltage. Although at that condition current through the diode can be of any value depending on the load connected with the diode. That is why zener diode is mainly used for controlling voltage in different circuits.

4. Light Emitting Diode (LED):



Fig: 2.7.1.6 Light Emitting Diode

It converts electrical energy to light energy. It is used in traffic signals, camera flashes.

Transformer:

Transistor is made up of words "Transfer" and "Resistor". It means input signal is transferred from a low resistance circuit to a high resistance circuit. This transistor is made up of semiconductors. Silicon (Si) and Germanium (Ge) are some examples of semiconductors. This is also called "BJT " or Bipolar Junc-tion Transistor.Now, why this is called junction transistor? The answer lies behind the construction.
We already know what is p - type and n - type semiconductors.

In this type of transistor any one type of semiconductors is sandwiched between the other type of semi-conductor. For example, an n - type can be sandwiched between two p - type semiconductors or similar-ly one p - type can be sandwiched between two n - type semiconductors. These are called p - n - p and n - p - n transistors respectively. This is called junction transistor because there are two junctions of different types of semiconductors, . It's called "bipolar" because the conduction takes place due to both electrons as well as holes.



Fig: 2.7.1.7 Transistors

Bipolar junction transistor is a three terminal semiconductor device having two p-n junctions. It is able to amplify or "magnify" a signal and is a current controlled device. The three terminals of the BJT are the base, the collector and the emitter. When a signal of small amplitude is applied to the base, we get ampli-fied signal at the collector of the transistor. This is the amplification provided by the BJT. Note that it does require an external source of DC power supply to carry out the amplification process. The basic diagrams of the two types of bipolar junction transistors mentioned have been shown in above figure.

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Fig: 2.7.1.8 Transistors Types



Transistors in a Circuit:

They can be used in following configurations in a circuit depending upon the design and circuit requirements:

Common Base:

They can be used in following configurations in a circuit depending upon the design and circuit requirements:





Common Emitter:



Power Transistors:

- The junctions of the power transistors have comparatively larger areas than small signal transistors and have the following characteristics:
- Forward resistance values are generally lower than those for small signal silicon transistors. Similarly, they have lower reverse resistance values.

Power transistors are usually mounted on the heat sinks or heat radiators. They are sometimes mount-ed on the chassis using silicone grease to increase heat transfer

Darlington Transistors:

• A Darlington is a special type of configuration usually consisting of two transistors fabricated on the same chip or at least mounted in the same package. Darlington pairs are often used as amplifiers in input circuits to provide a high input impedance. Darlingtons are used where drive is limited and a high gain, typically over 1000, is needed. In this configuration the emitter base junctions are connected in series and the collector terminals are connected in parallel. A Darlington configuration behaves like a single transistor where-in the current gains (hfe) of the individual transistors it is composed of are multiplied together and the base-emitter voltage drops of the individual transistors are added together.



Fig: 2.7.1.11 DarlingtonTransistors

Field-effect Transistors:

- Field-effect transistors, like bipolar transistors, have three terminals. They are designated as:
- Source, drain and gate,
- Which correspond in function to
- The emitter, collector and base
- Of junction transistors.

Power Transistors:

- In normal junction FET operation, the gate source voltage reverse-biases the pn junction, causing an electric field that creates a depletion region in the source- drain channel. With the input (gate-source) circuit reverse biased, the FET presents a high impedance to its signal source. This is in contrast to the low impedance of the forward-biased junction bipolar transistor base-emitter circuit. Since there is no input current FETs emit less noise than junction transistors.
- MOSFET transistors, including those in the CMOS integrated circuits, are 'Enhancement Mode' type devices. With zero gate-to-source bias, these devices are off, and are increasingly turned on by the application of increasing gate-to- source bias (positive for n-channel, negative for p-channel).

Field Effect Transistor:

• FETs can be described as majority-charge-carrier devices, in which the current is carried predominantly by majority carriers, or minority-charge-carrier devices, in which the current is mainly due to a flow of minority carriers.[2] The device consists of an active channel through which charge carriers, electrons or holes, flow from the source to the drain. Source and drain terminal conductors are connected to the semiconductor through ohmic contacts. The conductivity of the channel is a function of the potential applied across the gate and source terminals.

The FET's three terminals are:[3]

- Source (S), through which the carriers enter the channel. Conventionally, current entering the channel at S is designated by IS.
- Drain (D), through which the carriers leave the channel. Conventionally, current entering the channel at D is designated by ID. Drain-to-source voltage is VDS.
- Gate (G), the terminal that modulates the channel conductivity. By applying voltage to G, one can control ID.



All FETs have source, drain, and gate terminals that are like the emitter, collector, and base of BJTs. Most FETs have a fourth terminal called the body, base, bulk, or substrate. The names of the terminals refer to their functions. The gate terminal may be thought of as controlling the opening and closing of a physical gate. This gate permits electrons to flow through or blocks their passage by creating or eliminating a chan-nel between the source and drain. Electron-flow from the source terminal towards the drain terminal is influenced by an applied voltage. The body simply refers to the bulk of the semiconductor in which the gate, source and drain lie. Usually the body terminal is connected to the highest or lowest voltage within the circuit, depending on the type of the FET.

Integrated Circuit:

Packages for digital ICs generally fall into three categories, which are delineated below:

Metal Case TO Type Packages:

In these, all the pins are in a circle and are numbered in counter clock-wise direction when viewed from the bottom. The pin closest to the orientation tab has the highest number. The most commonly used metal packages are TO-73 (12 leads), TO-99 (8 leads) and TO-101 (12 leads).

Dual-In-line Packages (DIL or DIP):

They have all leads arranged in two parallel lines. The most common package is T- 116, which has 14 pins. Another most common package is a 16-pins DIP, which has the same overall dimensions as that of 14- pin-DIP.

Flat Packages:

They are smaller than the TO-16 packages and therefore allow higher packing density. They can be assem-bled on both sides of a PCB. They are preferred for use in military equipment

Manufacturer's Codes:

Manufacturers often introduce their own types, for commercial reasons, or to emphasize that the range belongs to a special application. Some common brand specific prefixes are:

- TIS = Texas Instruments, small signal transistor (plastic case)
- TIP = Texas Instruments, power transistor (plastic case)
- MPS = Motorola, low power transistor (plastic case)
- MRF = Motorola, HF, VHF and microwave transistor
- RCA = RCA.

IC Protector

The IC Protector (ICP) is an overcurrent protection device having stable and high-speed circuit tripping characteristics which enable these devices to shut off the circuit quickly and safely. This quick shut-off response protects valuable semiconductor devices and circuits from common load short-circuit failures.

Features:

- Precise and Extremely Stable Cut-off Characteristics
- Small Internal Resistance with Low Voltage Drop
- Non-flammable
- Compact

Applications:

• Overcurrent Protection

NTE Type Number	Case Style	Maximum Rated Voltage (Volts	Maximum Rated Current (Amps)	Typical Internal Resistance (Ohms)	Operating Temperature (°C)	Storage Temperature (°C)
15005E	"F" Туре	50	0.4	0.220	-55 to +125	-55 to +125
15006E	"F" Туре	50	0.6	0.135	-55 to +125	-55 to +125
15007E	"F" Type	50	0.8	0.100	-55 to +125	-55 to +125
15008E	"F" Туре	50	1.0	0.070	-55 to +125	-55 to +125
15009E	"F" Type	50	1.5	0.042	-55 to +125	-55 to +125
15019E	"N" Type	50	0.25	0.350	-55 to +125	-55 to +125
15020E	"N" Type	50	0.4	0.220	-55 to +125	-55 to +125
15021E	"N" Type	50	0.6	0.135	-55 to +125	-55 to +125
15022E	"N" Type	50	0.8	0.100	-55 to +125	-55 to +125
15023E	"N" Туре	50	1.0	0.070	-55 to +125	-55 to +125

Tab: 2.7.1.2 Resistance Codes



TransistorType Numbers

 \emptyset Overtheyears, manufacturers have issued thousands of separate transistor type numbers. Many are now not used. Some of the common numbers / types are :

Ø JointElectronDevice EngineeringCouncil(JEDEC)

Ø The transistor markings inthiscase takethe followingform:Digit,letter,serial number,(suffix),

 \emptyset where the letteris always'N', these rial numberruns from 100 to 9999 and tells nothing about the transistorexceptits approximate time of introduction. The (optional) suffix indicates the gain (hfe, or B). For example:

Ø A =lowgain B=medium gain

 \emptyset C= highgain No suffix = ungrouped(anygain)

Ø Examples:2N904, 2N3819,2N2221A.

Ø Thedatasheetsgiveinformationon theactualgainspreadand groupings. The reasonfor gaingroupingis thatthe lowgain devicesare usually cheaperthan the high gaindevices





Fig: 2.7.1.14 Electric and Electronic Symbols

CRT, LCD or LED Display

To show the picture, we need a display. It is like if I write on a white board, I have to write with a marker of a dark colour. Also, there should be light either on the board or in the room because our eyes can not see in darkness. So, we have to first choose a screen which can either have its own brightness or which uses a external light for brightness.

CRT Display:

Here we use CRT as a Screen on which we can display the picture. A CRT OR Cathode Ray tube is used in TVs. Earlier B&W CRTs were used. Later, Colour CRTs were used. Colour CRTs have phosphors of Red, Green and Blue and when these phosphors are bombarded with electrons, they emit their colour e.g. red phosphor will emit red colour if it is bombarded with electrons.

LCD:

It means Liquid Crystal Display. In this Liquid crystals are used to guide the direction of light. But since these crystals do not have their own light, we use a back light. In LCD Display, CCFL back light was and is used. CCFL means ' Cold Cathode Fluorscent Light '

LED :

It means Light Emitting Diode. In this, for back light, LEDs are used in place of CCFL. This has certain advan-tages as we will see later.Such a TV which uses LEDs as back light uses Liquid Crystals also to guide the direction of light. It is called a LED TV as per the name used by a TV manufacturer though it is correctly a LED LCD TV because it is using LCD crystals for guiding light produced by LEDs.

OLED TVs:

They have their own light and so do not need a back light.

UNIT 2.8: Know Your Tools

- Unit Objectives

At the end of this unit you will be able to:

1. Identify and Operate various tools and equipments required to carry out repair work of TV

Do

- Show them various tools required for TV installation and repairs
- Let them try their hands on the various tools required for TV installation and repairs

Ask

- Ask the participants to recapitulate learnings from earlier sessions
- Ask them enumerate the tools required for TV installation & repairs
- Ask them to describe various tools required for TV installation & repairs with uses of each of them
- Ask them if they feel comfortable using these tools

Demonstrate

- Demonstrate the use of various tools required for TV installation and repairs during practicals
- Demonstrate use of various measuring equipment used for TV repairs
- Demonstrate use of resistors, capacitors, inductors incircuits
- Demonstrate and compare FPD, LCD, LED TV displays

Notes for Facilitation

- TV has entertainment value as well as educational value
- TV program contents have a great impact on the viewers
- TV repair technician must be master of the required tools and their usage

2.8.1: Tools and equipment needed for Television Repair

Replacement parts are available from the manufacturer, aftermarket suppliers, and local electronic stores. The tools you will need to fix a TV include:

- Digital / Analogue Multi Meter
- Soldering Iron with lead free solder wire
- Screwdrivers
- Pliers
- Lense
- Tweezer
- Cutter
- Desoldering Pump and desoldering wick
- Drill Machine and bits

Screw drivers: Philips and other screw drivers are used. Only the correct screw driver should be used to open the screws. After opening a screw, same should be placed safely as same has to be fixed back. When a TV is disassembled, its assembling is done in the reverse order.

Pliers, tweezers, Cutters:

These are used for various jobs while working on the TV.

Desoldering Pump

This should be of a standard make or as per the recommendation of your Company.

Multi Meter

Analogue Multi Meter:



Fig: 2.8.1.1 Analogue Multi Meter

In old times, this multi meter was used. It has a needle and it has – and + sockets in which –(Black colour) and + probe (Red Colour) are fixed before we take any reading.

Digital Multi Meter:



Fig: 2.8.1.2 Multi Meter 1

It is digital and is called Multi because one can take multi readings like: AC and DC Voltages, Resistance, Current, continuity etc and can also check diodes and transistors. This is a very useful instrument and engineers use it to repair a TV in field.

While using it, you should first put the probes in the proper sockets. Also, when measuring any voltage always connect the ground lead first. After this, select the parameter to be measured like:

AC or DC voltage

Current

Resistance

Diode and Transistor

Using a Multi Meter:

A multi Meter is used to check resistance, AC or DC Voltages and diodes. It can also be used to measure currents. Checking Resistance: For this, select a suitable resistance range. If the resis-tance is in circuit, switch off the set, take out one end of the resistance.Insert the red and black probes in the respective sockets in the multime-ter. Now the other end of red probe is connected to one end of resistor. The other end of black probe is connected to the other end of the resis-



tor. The value of the resistor will be displayed on *Fig: 2.8.1.3 Multi Meter 2* the screen of multimeter as shown in the following figure: Checking AC Voltage: Always select the highest range when measuring unknown voltage or current. Select the highest AC Voltage range in this case. Now insert the red probe into the red socket and the black probe into the black socket (common socket). As the voltage is measured in paral-lel, touch the black probe to the neutral point in the AC circuit and the red probe to the phase or live point. The AC Voltage will be displayed on the screen as shown:



Fig: 2.8.1.4 Multi Meter 3

Checking DC Voltage:

Select the correct DC Voltage range. Here also, the voltage will be measured in parallel. Connect red probe to the positive point and black probe to negative point.



Fig: 2.8.1.5 Multi Meter 4

Checking a diode: It is checked in continuity range.



Fig: 2.8.1.6 Multi Meter 5



Fig: 2.8.1.7 Multi Meter 6

Checking a fuse: It can be checked in continuity range:



Fig: 2.8.1.8 Multi Meter 7

Soldering Iron:

This is used to solder components on the chassis. It can be of 10/15 or 25W and should be ESD safe. Good quality and lead free solder must be used. After checking the set, it becomes clear if the set needs replace-ment of spares. If yes, connect the iron to AC 220 V so that it is heated by the time you open the back cover. It saves precious time.

When you have to solder, first take out the defective part using de soldering pump / soldering iron and wick. Do the tinning of the leads of the part that needs to be fixed. Now fix the leads into the holes and heat up a lead and apply slight solder. One learns this with practice. After soldering and component cooling, cut the extra leads with a cutter.

Precaution:

Keep the iron safely at customer's house so that no one touches it accidently and it is out of reach of children. Do not throw solder leftover on the floor.



Fig: 2.8 1.9 Soldering Iron, solder wire and paste



Fig: 2.8.1.10 Soldering Iron & Desolder pump



Fig: 2.8.1.11 Stud Finder

Fig: 2.8.1.12 Cable or wire finder

Shown below are some of the screws used these days;



Fig: 2.8.1.13 Screws

Exercise:

- 1. What is colour code for a resistance of 120 Ohms 10% tolerance?
- 2. Find colour code for resistance of 10 Ohms 1% tolerance?
- 3. Draw symbols of NPN, PNP transistors, PN Diode

Notes 📃	
-	
-	
-	
-	







Transforming the skill landscape



3. Basic Television System

- Unit 3.1 Types of Television Set
- Unit 3.2 Block Diagram of Television
- Unit 3.3 Scanning Process
- Unit 3.4 Different Inputs of Television Sets
- Unit 3.5 Home Theatres and Connection to the TV sets



ELE/ Q3101

- Key Learning Outcomes

At the end of this module, you will be able to:

- 1. Explain various types of television system and its characteristics
- 2. Identify circuit in block diagram of TV
- 3. Explain persistence of vision, Compatibility and characteristics of light
- 4. Connect various types of input system provided in TV
- 5. Connect setup box with TV

UNIT 3.1: Types of Television Set

– Unit Objectives 🮯

At the end of this unit you will be able to:

- 1. Explain difference between CRT and Flat Panel TV
- 2. Describe various types of Flat Panel TV and their characteristics

Do 🗸

- Show them different types of TV : CRT, LCD, LED, Plasma
- Explain them differences between CRT, LCD, LED TV
- Show them TV remote applications
- Show them how to clean TV Screen

Ask 🤄

- Ask the participants to recapitulate on the learnings from the earlier sessions
- Ask them to differentiate between CRT & FPD TV
- Ask them to differentiate between LCD & LED
- Ask them if they have seen Plasma TV

Demonstrate

- Demonstrate TV remote control applications during practicals
- Demonstrate correct TV display settings : Brightness, Contrast during practicals
- Demonstrate TV screen cleaning procedure during practicals
- Demonstrate use of common tools used for TV installation and repairs during practicals

Notes for Facilitation

- On an average people are spending 3.5 hrs every day viewing TV
- We should use correct distance from TV set, brightness and contrast settings to minimise strain on eyes

3.1.1: There are generally two types available

CRT TV or Cathode Ray Tube TV :

The CRT TVs were Black and White in the beginning as it was a monochrome TV which showed only B& W pictures. Later with technological advancement, Colour TVs were started which used a Colour Picture tube and these showed pictures with colours. In CTVs also there were different models like Flat TV, Full and Flat or FFST which used the so called " full and flat square tube ". In Indian market we now hardly find any B&W TV being sold though some people may still be having very old B& W TVs, if they are still working. Even the Colour TVs (CRT TVs) are on their way out.

FPD or Flat Panel Display:

As the CPTs were curved on the front and there were certain other technical issue like colour patches, convergence etc. FPDs were introduced where the display screen was not a CRT but a flat panel and for lighting the screen different techniques were used which we will discuss now. Flat panel TVs are available only in colour.

Flat Panels can be of the following types; Plasma LCD LED OLED



Fig: 3.1.1.1 Plasma Panel

Plasma panels are now not popular as there are several issues with them.First of all the power consump-tion is high as compared to LCD or LED TVs. Due to more poer consumption, they are also not eco friendly as compared to other Flat panel Screens.Secondly if any image remains on screen for a longer time, screen or pixel burn may occur due to which the static image is formed on that part of the screen and that effect can not be removed because the pixels in that part may have burnt.

The life of the Plasma panel can also be said to be an issue as earlier models of LCDs had more life. Plasma panels also have an issue at heights as at these places the gas pressure reduces and since Plasmas use gas, problems of starting with a sound or late start etc. can occur in Plasmas when they are used at heights like hills and mountains

The advantages of Plasma are:

Their contrast is excellent as in a CRT TV because they have their own light in form of phosphors like in CRT TV and they do not use back light like LCD TV does.

Their brightness variation from minimum brightness or black to maximum brightness is good and due to this one can get good black colour which means good contrast.Because of this they give deeper black and rich colours.

They also do not show any ghost effect in fast moving pictures like in LCD TVs because they are using phosphors and not liquid crystals. In LCD TVs, the ghost images can be seen if response time is high. These days response time in LCD TVs is alos very low. Yet Plasmas still are better in that just like CRT TVs. There are several other points on which comparison can be made between a LCD TV and a Plasma TV.



Fig: 3.1.1.2 Plasma Panel 1

LCD panels are the most commonly-used type of panel in flatscreen televisions today. They offer a lot of benefits, such as low heat generation, no static image burn (which can happen in a Plasma display), and a greater brightness over plasma. LCD panels are lighter in weight as compared to plasma. A customer can choose between active shutter and passive glasses when purchasing a 3D-capable model. Further, older LCDs did not give perfect black due to which LCDs had issues with brightness and contrast. However, as compared to this CRT TVs give excellent contrast as they give perfect black. Also for such LCDs the ghosting problem with fast-moving images also occurred.To improve this the 120Hz and 240Hz refresh rate modes were used and with this there was improvement. If customer does not mind switching between these modes when switching between sports and film, it is good. LCDs can also have dead pixels and a new LCD TV may have one or more dead pixels. If a customer finds any such dead pixel and is not comfortable with dead pixels, he should immediately contact the company and claim replacement so that he can get the replacement within warranty period as otherwise he may have to keep the same LCD TV with him.



Fig: 3.1.1.3 LCD Panel

IPS LCD panels with In-Plane Switching (IPS) are better than standard LCDs and plasma panels. If one moves to a corner (from the central line of the screen) one can notice that the picture contrast reduces, colour also changes and picture may even become negative. This happens because normal LCD TVs do not have a wide viewing angle like IPS LCD TVs. This is because viewing angle is rather narrow on most TVs. IPS LCD panels offer viewing angle of up to 178 degrees which means they offer viewing angle of 79 degree on either side of the TV.

Viewing angle is also shown in vertical terms in addition to Horizontal because some customers may like to mount the TV in a different way. Thus the customer can view the TV from any side of TV and enjoy as claimed by most manufacturers. However, it must be remembered that the "soft spot" to get the best picture will be for a person who is sitting just in front of the TV though if you see from a side there will be a slight difference but not as much as with a normal LCD TV. In Installation also, it is explained that engineer must ask the customer where he would like the LCD TV to be placed / mounted. But, if the place of customer's choice is not as per standard guidelines, you must educate the customer about it. If custom-er still wants LCD to be wall mounted at his choice location, you must put these remarks in job sheet. Some monitors of Apple monitor, iMac, or iPad have a LCD panel with IPS.



Fig: 3.1.1.4 LCD Panel with IPS

A simple LCD display uses CCFLs for its back light. CCFL stands for "Cold Cathode Fluorscent Light ". This is not as efficient or effective as LEDs. All LED backlit displays are not and the evenness of the backlighting can vary, and that can be checked by displaying a pure black image on the television. This way we can check the evenness of the backlighting. Yet, LED-backlit displays offer quite a few advantages. The displays are thinner. These TVs consume less power, provide added brightness. Further they give better contrast as compared to normal LCD TVs. Their heat dissipation is also better. However because of the LED backlight, they are costlier as compared to LCD TVs.



Fig: 3.1.1.5 LCD Display

OLEDs are organic LEDs. This is the latest technology and many Companies have also launched their OLED models in the market . They're thin, light, and don't require backlighting. It is because organic LED s produce their own backlight. So, they are in a position to give very deep blacks and they also give superior contrast ratio as compared to the LED TVs where LED backlight is used. Images from OLED displaysappear closer to reality because of their contrast capabilities. In a LCD panel display-ing dark pictures may be an issue while this issue is not there in an OLED. But the cost of OLED panels are higher as compared to other FPDs and these have been recently launched.

UNIT 3.2: Block Diagram of Television



At the end of this unit you will be able to:

1. Explain block diagram of Television



• Show them different illustrative block diagrams and explain their feature



- Ask the participants to recapitulate learnings from earlier session
- Ask them to draw block diagram for TV
- Ask them to explain the TV block diagram



• Demonstrate doing connections as per the block diagram



• Block diagram simplifies understanding the complex circuits & connections



UNIT 3.3: Scanning Process





At the end of this unit you will be able to:

1. Explain persistence of vision, Compatibility and characteristics of light

Do

• Let the participants try visualising the effect of persistence of vision resulting in motion pictures

• Show slow motion actions and fast forward actions

• Ask the participants to recapitulate learnings from earlier sessions

Ask them how series of pictures can produce movement and actions on the screen



Ask

- The impression of an object seen by the eye persists on the retina for 1/16 th of a second, even after the object is removed. If another object is seen before this time, the impressions of the two merge to give us the sensation of continuity.
- This forms the basis animation pictures



• Demonstrate how motion pictures result in animation during practicals

Notes for Facilitation

• A visual image is retained for a short period of time, even after the removal of the stimulus that produced it, thus creating the illusion of movement when viewing motion pictures.

When we discuss Picture information, we find it is optical. There are infinite number of small areas which have bright and dark information. These small areas can also be called Elements. The smallest Picture element is also called 'Pixel ". When all these picture elements are seen in totality, we view the scene. To transmit this information, the scene details have to be captured first. Scanning is used to do this. AlL picture elements are scanned element by element in a sequential manner at a very fast rate. Then this optical information is converted to Electrical information for being transmitted with sound signal. In CCIRB Standard, there are 625 scanning lines. Thus a camera scans each line element by element from left to right. This is called TRACE. After reaching the extreme right of a line, the camera returns to extreme left just like we read a page in Hindi or English. This is called RETRACE. In CRT TV technology this time of retrace is used in Fly Back Pulses. Thus the camera not only moves from left to right, it also moves down to read the next line. In this way, all 625 lies are scanned. Once this scanning is over, it means the scanning of that particular scene is over.

Persistence of Vision:

Human eye has a limitation which is used as an advantage in movies and TV Transmission and reception. If a scene is shown 25 times in a second to human eye, the eye integrates the information and sees move-ment in that. So, to show a movement a frame is filmed / recorded in 25 different frames, each frame slightly differing from the first. These 25 frames are then shown to the eye one after the other in one second and eyes get sensation of movement

Compatibility:

In B&W TV, brightness information of a scene is done by Scanning. In colour TV, information of colour has also to be collected. There are 3 systems for transmission and reception his information this: PAL B/G: Phase Alteration by Line

NTSC: National Television System Committee

SECAM: Sequential Error a Memoir

But for Colour TV Transmission, there are certain other requirements also so that colour system can generate a B&W picture on a B&W TV.

Also, if colour tv receives a B&W signal, it should generate a B&W picture. Both these are called Compati-bility and Reverse Compatibility.

To ensure that these conditions are met, colour information is encoded in a manner that it can be transmitted in the same channel bandwidth of 7 MHz. At the TV receiver, a colour decoder is used to decode the encoded colour signal.
Characteristics of Light:

From the Electromagnetic spectrum, we see that visible spectrum is around a frequency of 5*10^14 Hz. Human eye sees light when radiation from sun reaches the eye in correct proportion. As per Helmholtz, human eye has rods and cones. While rods see brightness, cones see colour. In color theory there are three primary colors: red green and blue, or its printed complements, cyan, magenta, and yellow A fourth "primary," black, is used for printed color.

Additive color:

The additive primaries red green and blue generate colors. The three colors are projected onto a screen in various intensities to produce all colors. Color on television and monitors is produced by three color "guns" corresponding to each additive primary. These produce color intensity based on a voltage level, from 0 to 255. Obviously, 0, 0, and 0 will produce black, or absence of color, and 255, 255 and 255 will produce white

This calculation can be done for colours which can be reproduced in a FPD. If the micro computer is of 8 bits, colours produced for Red= $2^8=256$ ($2^22^22^22^22^22^2$) Colours produced for Green= $2^8=256$

Colours produced for Blue=2^8=256 Total Colour shades which can be reproduced=256*256*256=16.77 Million But for CRT TV, we can not check the colours produced in this manner



UNIT 3.4: Different Inputs of Television Sets



At the end of this unit you will be able to:

1. Explain various types of input system used in Television sets

Do

• Let the participants study TV inputs

Ask

- Ask the participants to recapitulate learnings from the earlier sessions
- Ask them to enumerate the inputs to TV sets



• Demonstrate Various inputs to TV sets during practicals

Notes for Facilitation

• VGA (Video Graphic Array) cable connects laptop to TV set, enabling display oflaptop screen on the TV screen

3.4.1: RF Connector

RF Connector

There were two ways to get a signal into a TV: an RF connector for antenna or cable and an A/V for com-posite video withMono or Stereo sound. These were available in CRT TVs. With introduction of High Definition signal, inputsignals to TV were increased with different options of signal being available. Digital cameras with a TV output are connected to the TV's composite video (yellow coloured Jack and yellow coloured socket)) input. Many consumer camcorders also use Composite Video signal. But resolu-tion of Composite video is not compatible to high-definition. Resolutions of Component video and S-Vid-eo compatible are also not compatible to High Definition.

Compatibility: It means that when a signal like composite video is given to a HD panel whose native reso-lution is , say, 2 Mega Pixels, picture may not be displayed on the screen or if at all it is displayed, it may be distorted. Moreover these are analogue signals.



Fig: 3.4.1.1 RF Connector

Composite Video/Audio

The resolution of a S-Video signal is better in comparison to RF or AV analogue signals and nowpanels with high native resolution are available due to which the picture clarity improves as even a very small point on the screen can be visible. However, to show that the signal should also be of High Definition. While TV manufacturers still include composite video, S-Video ports are now not found on LCD / LED TVs.



Fig: 3.4.1.2 Composite Video/Audio Cable

S V G A Connector

Component video which transmits analog signals but now all-digital HDMI connections, which also carries the audio are also available. It is better if a TV has more HDMI ports because HDMI is now on all types of source components. However, if you've set up a home theater sound system, the receiver is likely to have multiple HDMI inputs, and by switching your source in the receiver, one HDMI input on your TV is sufficient.



Fig: 3.4.1.3 HDMI Cable

For connecting a PC or Laptop to a FPD TV (CTVs do not have a VGA port as they are not compatible to the VGA resolution), we use a VGA cable as shown in the figure and connect it to the VGA Port in the FPD. This VGA Port is also called a PC input or 15-pin D-Sub. This is an analog signal without sound, but one gets high-definition image quality. For taking sound from PC or laptop, we have to use the Auxiliary and sepa-rate cables



Fig: 3.4.1.4 VGA Cable

UNIT 3.5: Home Theatre and connection to the Television Set



At the end of this unit you will be able to:

- 1. Connectivity of setup box with TV sets
- Do
- Let the participants enumerate TV connections
- Ask
- Ask the participants to recapitulate learnings from earlier sessions
- Ask them the functions of setup box
- Ask them what is DTH : Direct To Home
- Say 🤷 🗕
- DTH : Direct To Home is receiving signals at Home TV through sattelite



• Demonstrate TV connections during practicals



• Tata Sky DTH service is popular in our country

3.5.1: Home Theatre and connection to the Television Set

• Connect the Cable/ Satellite Box to the TV as shown.

Connect the home theater system's AUDIO IN-AUX jacks to the AUDIO OUT jacks on the cable/satellite box using an audio cable (red/white –Some manufacturers supply some cables as accessories with some of their TV Models).

- Do the proper selection in Auxiliary and connect the speakers properly ie. If it is 5.1 system, you have to select the switch for 5.1.
- It should be clear that if speakers are not connected to the proper ports or if selection is not done correctly, there may not be any sound at all or it may be a case of sound distortion or less sound out put.



Fig: 3.5.1 Cable satellite box

Exercise:

- 1. What is the difference between a CRT TV and a LCD TV?
- 2. What do you understand by "Response Time"?
- 3. Which ports can be used to connect a Laptop?
- 4. How many speakers are there in 5.1 sound system?









Transforming the skill landscape



4. Installing of TV

Unit 4.1 – Installation Criteria

Unit 4.2 – Safety Requirements

Unit 4.3 – Remote Control of Television Set

Unit 4.4 – Installing a Television Set

Unit 4.5 - Check TV set's functioning



- Key Learning Outcomes

At the end of this module, you will be able to:

- 1. Collect requirements for installation
- 2. Take necessary steps to avoid safety hazard
- 3. Explain concept and functioning of remote control device
- 4. Apply standard procedure for installation of TV
- 5. Perform testing procedure after installation

UNIT 4.1: Installation Criteria



At the end of this unit you will be able to:

1. Apply procedure for the installation criteria

Do

Ask

- Do "Role Play "session, when one of the participant becomes the customer & another the TV Repair Technician, who is visiting for TV installation
- Do TGR (Things Gone Right) and TGW (Things Gone Wrong) analyasis
 - Ask the participants to recapitulate learnings from earlier sessions
 - Ask them what they understand by SOP : Standard Operating Procedure



Demonstrate TV installation procedures during practicals





• Always refer to the OEM's operating procedures during the TV installation

In planning installation at customer's house for flat-panel television, you have to seek inputs from custom-er. Once you get these, you can begin the installation:

Seating area:

- Where will the customer sit and where will other members of the family sit? This helps in deciding the soft spot where the customer will get the best view and best sound. Furniture
- You will need Space is needed to fit the equipment most home theater components require a space 18-20 inches wide by 22-24 inches deep to fit properly.
- What kind of seating does the customer want ? Is the room mainly to be a home theater entertainment area, or will music be part of what it's used for as well?

Aesthetics:

- The customer should be informed that it looks better if the equipment does not overwhelm the room. Wire access
- Ask the customer how he wants you to run wires to speaker locations? Will the equipment be next to the TV, or will it be hidden in another room or area?
- Is there enough wire to complete the project? It is better to have more wire.

Mounting:

- Generally manufacturers provide mounts as per their specifications for their TVs.
- What is the size and weight of the TV? All brackets have weight and size restrictions. It is necessary to make sure the TV will fit within the limitations of the mount.
- Will the mount be fitted into a tight space or cabinet? It may be impossible to use some brackets if the space does not allow the proper leverage.
- Does customer want to tilt or move the TV from time to time? There are mounts available.
- Will the TV be positioned at an angle? Special mounts and techniques will be required to keep the TV mounted at or into an angle.
- What will the TV be mounted to? It is necessary to have proper support for TV.

UNIT 4.2: Safety Requirement

- Unit Objectives 🧖

At the end of this unit you will be able to:

- 1. Explain safety requirements for installation of TV
- 2. Apply precaution for safety hazards



- Do Fire safety mock drill
- Show them safety signages



• Ask the participants to recapitulate learnings from the earlier sessions

• Ask them why safety is important for a TV Repair Technician

Demonstrate

- Demonstrate safety hazards during practicals
- Demonstrate safety precautions during practicals

Notes for Facilitation

- Ohsas : ISO 18001 covers Occupational Health and Safety Standards
- Safety is of ' prime most ' importance

An engineer must take care of the following safety hazards:

- **Electricity Hazard**
- Hazard due to fire
- **Electro Static Discharge**
- The first requirement of an engineer is to protect himself and to ensure that while he is working, people, if any, in the surroundings are also safe. So, a field engineer has to protect himself and ensure safety of the customer and the surroundings. For this he should ensure that
- He has the correct prescribed equipment i.e. Proper rubber shoes so that he does not get an electric shock while repairing TV at customer's house.
- He should have the right tools.
- He should take care of ESD Safety.
- His soldering iron should be ESD safe .
- He should wear cotton shirt to ensure that there is no ESD.
- PCBs, if any, and certain ICs should be in proper anti static packing.



Fig 4.2.1: Safety Signs

- He should take care of any loose wiring in customer's house.
- He has also to ensure that there is no liquid spillage at the floor in the workplace.
- He should also ensure that there are no obstructions around at the work place.
- He must also ensure that the soldering iron etc. are out of reach of kids and kids are either not allowed in the work area or not allowed alone to ensure their safety.
- Some safety symbols and the engineer has to take care of those:

4.2.1: More on ESD / Static Charge -

If due to any reason, only one type of charge carrier is added or removed from an object, it can create an electrical imbalance and a charge may be developed on the object. This is static charge. It can be neutralised only when it given a discharge path.

Static charge is generated due to:

- Friction
- Conduction
- Induction

4.2.2: Where from Static Electricity is generated

Insulation Material like polythene or polypacks Insulation mats, shoes, chappals etc, carpets Clothes Masking Tape

Failure due to ESD can be very high and can cause:

- Failure of product during Production
- Failure of product at customer's place at time of installation
- Intermittent Part Failure

Such failures can be very harmful as they also damage Company's reputation and credibility.



Fig 4.2.2.1: ESD Warning label

Wrist Strap for ESD Safety:



Fig 4.2.2.2: Anti Static Wrist Strap

ESD Safety Gloves:



Fig 4.2.2.3: Anti Static Wrist Strap 1





ESD Safe work Table:



TV Repair Technician



UNIT 4.3: Remote Control of Television Set



At the end of this unit you will be able to:

- 1. Explain concept of remote control device
- 2. Explain functioning of remote control device

Do 🗸

- Let the participants try controlling TV with remote
- Let them practice remote battery replacement

Ask 🥯

- Ask the participants to recapitulate learnings from earlier sessions
- Ask them why " Remote " is required for TV
- Ask them if remote makes them lazy

Demonstrate

• Demonstrate TV remote operations during practicals

Notes for Facilitation

- TV remote is an electronic device used to operate the device from a distance, usually wirelessly.
- Remote makes TV operations very easy and comfortable

The first remote intended to control a television was developed by Zenith Radio Corporation in 1950. The remote, called "Lazy Bones", was connected to the television by a wire. A wireless remote control, the "Flashmatic", was developed in 1955 by Eugene Polley.

How does a television remote control work?:

The main technology used in home remote controls is infrared (IR) light. The signal between a remote control handset and the device it controls consists of pulses of infrared light, which is invisible to the human eye, but can be seen through a digital camera, video camera or a phone camera. The Remote sends a pulse signal which is received by the Infra Red receiver which is fixed behind the transparent glass screen on the panel of the TV. This pulse is then sent to the micro computer or micro processor in the TV. The Micro processor then works as per the command received and further directs the relevant pin on the micro processor which then does the action as per the command. For example, if we press the power button on the remote and the set is already in stand by mode, the micro processor receives the command from the IR receiver and gives command to a particular pin which either goes high or low as per the circuit thus activating the power supply and the voltages are released thus switching on the set.

Installing a TV Set:



Fig 4.3: TV Remote Control

4.3.1: Needed Tools –

Some tools used in the installation profession are very costly. But the Companies provide these to their technicians. However, those who intend to start their own shops will have to purchase these tools on their own. But, this will be initial investment only. These tools can save time and help in proper installation as it is also important to ensure that walls of customer's house are not defaced or damaged during installation. The wiring may also need to be concealed so that it does not look clumsy. While drilling one has to ensure that wiring , if any, within the wall, is not damaged. We here give a list of tools needed for LCD

TV installation:

- Stud finder
- Tape measure
- Spirit Level
- Pencil
- Power drill and drill bits
- Socket wrench
- Allen wrench
- Wall probe piano wire, etc
- Wire running tools fish/carpet tape, flex rods, electrical tape
- Drill bit appropriate size to drill a pilot hole for the fastener you are using

The following steps are needed to carry this out:

- 1. Ask the customer where he wants the CTV to be installed. Check if the location is O.K. as per safety and viewing requirements. If not, guide the customer into choosing another location / wall (in case FPD TV is to be hanged).
- 2. Carry the carton to that place / room with customer's permission. Do not push or pull it.
- 3. Cut the packing tape with a cutting knife.
- 4. Take out the thermocol and the plastic cover and the accessories pack. Ensure that thermocol does not break.
- 5. Check and show to customer all the accessories. If there is any discrepancy, call your supervisor and inform him and then inform the customer that the discrepancy will be corrected as per your discussion with your supervisor.
- 6. Put the CTV on the table or at the customer's desired place but ensure the directions in Point 7.
- 7. Ensure that there is sufficient space behind the set and and on its sides. If it is inserted inside a cabinet or any space in a wall, ensure that there is sufficient ventilation so that the heat generated in the TV is properly dissipated. Inform the customer that when set is on, it should not be covered with any cloth etc as the heat generated inside will not be dissipated and there can be a mishap.
- 8. When the TV is on, there should not be any cover / cloth on its top / sides.

- 9. CRT TV Top should not be used as a table top and no magnetic or paramagnetic (iron) things should be put on top of it or near it .
- 10. Fix all the cables, wires properly and tie them with a tie so that they do not occupy useful space and do not create any hindrance.
- 11. There should not be any heat source near a TV and also no source from which TV may get moisture.
- 12. Use a 5 Ampere socket for TV and it should be near TV so that no extension cord is required for switch-ing on the TV.
- 13. No Multi socket should be used for TV i.e. except TV no other device is to be run on that socket.
- 14. Ensure that there is no sparking in the socket.
- 15. Connect the signal cables to the ports i.e: RF, AV, RGB / Component Video or USB.
- 16. Switch on the set and check all functions and tune channels if signal is RF.
- 17. If signal is from dish, it will receive signals once you have connected dish output to the respective AV Port of set top box.
- 18. In case of RGB, signal may be from DVD Player. Connect the output from DVD to the respective Video Ports i.e. R,G,B. Connect the sound also. If customer is using a Home Theatre, do connections through Auxiliary. For 5.1, you have to connect the respective speakers with the sound o/p ports. You have also to do the selection of switch ie. 2.1 or 5.1.
- 19. Adjust contrast, brightness, colour, volume as per customer's choice.
- 20. Check Volume settings and adjust as per customer's choice.
- 21. Depending on the signal available check picture and sound performance on those signals.
- 22. Check working of remote control, its range, viewing angle, and functions.
- 23. Check working of panel keys.
- 24. Check and ensure that there is no switch off spot.
- 25. Check and ensure that no patches are formed



Fig 4.3.1: TV Sets

Quick view:

This facility allows toggling between two channels (last viewed and current programs)

- Benefit: If viewer is watching programs on 2 different channels, he can switch channels without press-
- ing channel number

Channel scan:

This feature enables scanning all tuned channels with a single key on remote

- Benefit: If viewer forgets channel number of a program, he can use scan to locate that channel instead
- of searching through all the channels

Blue Back with Audio Mute:

This feature is activated on no signal or very weak signal at RF terminals. The screen turns blue and

- sound is muted
- Benefit: The viewer is spared of the noise when a loss of signal occurs

Auto switch off on no signal:

This signal is activated when in case of no signal for 15 minutes. The TV goes to stand-by mode auto-

matically.

Benefit: The viewer is saved trouble of switching of TV if there is no signal for a long time.

Channelskip:

This skips channels while in channel scan or in Up/ Down mode. Benefit: For example, if viewer does not watch all regional language channels, he can skip all these channels so that when he is surfing channels, these channels are automatically skipped

Soft Start (Curtain Effect):

- This is a safety feature in advanced TVs to turn TV on gradually when the power is switched On.
- By switching On TV gradually, the life of the picture tube is increased

Zoom:

Soft Start (Curtain Effect):

- This is a safety feature in advanced TVs to turn TV on gradually when the power is switched On.
- By switching On TV gradually, the life of the picture tube is increased

Self-demonstration: (Dynamic):

- The TV gives demonstration of all features one by one in sequence.
- The function shows features to user by varying the levels so that user can see the difference

Benefit: It helps user to get familiarized with various features in TV by pressing a single button

Clock:

- This helps to set time in the tv and helps execution of ON/OFF TIMER features. The clock settings are lost whenever TV is switched OFF
- Benefit: The display shows time. The clock is used to set alarm , On /OFF /Sleep timer and Scheduler.

Alarm:

- This allows switching ON/OFF the TV set everyday at predetermined time.
- Benefit: Viewer can use TV as alarm clock. Time and channel can be set TV automatically switchs ON/OFF at

ON /OFF/ Sleep timer:

- These features allow switching On or Off TV set at desired time. Sleep timer helps switching off TV at set time.
- Benefit: The user does not need to switch On/Off TV at particular time, especially when he is busy

Digital Super Scene Control:

- It ensures vibrant and true colours on TV screen.
- Benefit: The viewer sees pictures closer to natural skin colours.

Digital Black Stretch Circuit:

- Improves black level of signal.
- Benefit: This results in enhancement of contrast of picture making picture more live.

Digital Noise Reducer:

- This feature helps in reducing noise content in picture
- Benefit: This feature is especially useful in far off or hilly areas having weak signals.

Volume PP ON/OFF:

- A global volume setting is assigned to all channels
- Benefit: The volume fluctuations that happen while changing channels is taken care of. The viewer can surf channels late into night without disturbing others.

Volume Fix:

- With this viewer can set upper limit for Volume level beyond which increase in volume level is not possi-ble.
- Benefit: This feature is useful when user wants to prevent others from increasing volume above a certain level

4.3.2: Check the Voltage available at supply point: -

Voltage:

Phase to Neutral= 230V as per current Indian

standards Please note that

Voltage between Phase and Neutral=Voltage between Phase and Earth + Voltage between Neutral and Earth. It is also important to understand that a only maximum of upto 10 Volts can be between Neutral and Earth.

Also, Phase should be controlled through a switch. As per Indian standards, phase should be on the right side in a socket and as stated above, needs to be through a switch only. The socket should be of the correct rating as per the specifications provided in the product manual and should be BSI compliant. BSI means " Bureau of Indian Standards " and it is mandatory for the manufacturer of the electrical socket to get certified by BSI because if the quality of the electrical socket is not as per standard, it can cause an electrical shock and can result into a mishap.

But there should not be any shorting between Neutral and Earth

UNIT 4.4: Installing a Television Set

– Unit Objectives 🮯

At the end of this unit you will be able to:

1. Apply standard procedure for the installation of various types of TV

Do

• Prepare Sop : Standard Operating Procedure for TV installation

• Study OEM's installation instructions as given in their manual



- Ask the participants to recapitulate learnings from earlier sessions
- Ask them what precautions are necessary during installation of TV at customer's place



• Demonstrate TV installation SOP during practicals

Notes for Facilitation

• TV installation is a skilled job.

Check the Voltage available at supply point. Voltage:

Phase to Neutral= 230V as per current Indian

standards Please note that

Voltage between Phase and Neutral=Voltage between Phase and Earth + Voltage between Neutral and Earth. It is also important to understand that a only maximum of upto 10 Volts can be between Neutral and Earth.

Also, Phase should be controlled through a switch. As per Indian standards, phase should be on the right side in a socket and as stated above, needs to be through a switch only. The socket should be of the correct rating as per the specifications provided in the product manual and should be BSI compliant. BSI means " Bureau of Indian Standards " and it is mandatory for the manufacturer of the electrical socket to get certified by BSI because if the quality of the electrical socket is not as per standard, it can cause an electrical shock and can result into a mishap.

But there should not be any shorting between Neutral and Earth

The following steps are needed to carry this out:

- 1. Ask the customer where he wants the LCD TV to be installed.
- 2. If it is on a wall, check its strength. The wall should be strong enough to hold the load of a hanging LCD TV. The LCD should not be hanged on a cracked wall or on a wooden / ply partition as these may collapse leading to a mishap.
- 3. Ask the customer who will sit in front of the LCD TV. The height of the tv is decided on various factors like this and distance from the TV, Viewing angle etc .
- 4. Check and see the location of AC socket.
- 5. Sun light should not fall directly on thescreen
- 6. There should be sufficient space in the front of LCD TV so that there is no blockage.
- 7. LCD TV will not be hanged below indoor unit of an Air Conditioner.
- 8. Carry the carton to that place / room with customer's permission. Do not push or pull it.
- 9. Cut the packing tape with a cutting knife.
- 10. Take out the thermocol and the plastic cover and the accessories pack. Ensure that thermocol does not break.

- 11. Check and show to customer all the accessories. If there is any discrepancy, call your supervisor and inform him and then inform the customer that the discrepancy will be corrected as per your discussion with your supervisor.
- 12. Check to see if there are any breakages, scratches, dents etc. If no, show to the customer that product is in OK condition. If not, call your supervisor and inform him and ask him for the solution so that you can also inform customer about it.
- 13. Put the LCD TV with its panel facing downwards on a cushion to ensure no scratches develop on the panel of the LCD TV.
- 14. Take out the wall stand. If the customer wants the LCD to be put on a table etc. you will have to fix the table stand.
- 15. Take the measurements on the wall as per your discussions with the customer.
- 16. Do the markings on the wall.
- 17. Lay some paper on the floor adjacent to the wall where LCD is to be hanged to ensure that the debris falls on paper after drilling.
- 18. Drill the holes and fix the fastners in them.
- 19. Check the levelling with spirit leveller.
- 20. Note down the Model number, set s.n. on your job card.
- 21. Fix the LCD on to the stand.
- 22. Ensure that there is some space on sides. Inform the customer that when set is on, it should not be covered with any cloth etc. as the heat generated inside will not be dissipated and there can be a mishap.
- 23. Fix all the cables, wires properly and tie them with a tie so that they do not occupy useful space and do not create any hindrance or if possible check with customer so that concealed wiring can be done as shown in figures shown below. For this one method is to use a channel from the back side of the LCD. This channel goes down near then power point and the signal source from where the power wires and signal cables go inside the channel. The channel can be got painted by the customer to match with the wall colour.
- 24. There should not be any heat source near the LCD TV and also no source from which TV may get mois-ture.

- 25. If LCD has to be installed in a kitchen, ensure that above points are taken care of.
- 26. Use a 5 Ampere socket for TV and it should be near TV so that no extension cord is required for switch-ing on the TV.
- 27. No Multi socket should be used for TV i.e. except TV no other device is to be run on that socket.
- 28. Connect the signal cables to the ports i.e: RF, AV, RGB / Component Video or USB, VGA, HDMI
- 29. Switch on the set and check all functions and tune channels if signal is RF.
- 30. If signal is from dish, it will receive signals once you have switched on the set top box and connected dish output to the respective AV Port.
- 31. In case of RGB, signal may be from DVD Player. Connect the output from DVD to the respective Video Ports i.e. R,G,B. Connect the sound also. If customer is using a Home Theatre, do connections through Auxiliary. For 5.1, you have to connect the respective speakers with the sound o/p ports.
- 32. If customer wants to see some pictures or videos through USB, insert the pen drive into the USB Port. Now, select USB in TV /AV or Source. The video /picture or audio files will be detected. Same can be selected and viewed. It is important that now there are various video, audio and picture formats and customer may have downloaded some files from some sites on net. The manufacturer clearly informs in customer manual as to which formats will be supported and engineer must be aware of it. In some cases, if the video format is not being supported, engineer can get the file from the customer and get same converted to MPEG 4 at his workshop using a video converter (or he can covert it at customer's house if he has a laptop and video converter in it. Once converted to MPEG 4, the video can be viewed.
- 33. Adjust contrast, brightness, colour, volume as per customer's choice.
- 34. Check Volume settings and adjust as per customer's choice.
- 35. Depending on the signal available ask the customer and connect the signals if he so desires and inform him about it.
- 36. Check working of remote control, its range, viewing angle, and functions.
- 37. Check working of panel keys.
- 38. Adjust contrast, brightness, colour, volume as per customer's choice.
- 39. Check Volume settings and adjust as per customer's choice.
- 40. Depending on the signal available ask the customer and connect the signals if he so desires and inform him about it.
- 41. Check working of remote control, its range, viewing angle, and functions.
- 42. Check working of panel keys.

Height of LCD TV can be at 100 to 120 cm above the Ground Level and The middle of LCD TV should be at viewer's eye level so that viewer can comfortably watch the TV.

Note: - If LCD TV is installed above or below the eye level, viewer may have to change his neck position to watch the picture causing strain in neck. Also, this will not be the best position for viewing as viewing angle will be changed and viewer will not get best picture and may later make a complaint for same. If viewer insists installation in such a manner, first educate him about disadvantages of doing so and if he does not agree, install it but inform him also that if he wants reinstallation at a later date, he may have to pay for same as per your company policy because normally companies give first time installation free. Request him to write his request on the job card and get his signatures on it.

The following figures show the method of a LCD TV. It also shows the method of concealing the wires and cables. It should be noted that concealing the wiring also depends on the kind of wall on which the LCD is to be hanged Depending on that the wires and cables are concealed.





Fig 4.4.1: Mounting TV Panel on Wall

Facilitator Guide



UNIT 4.5: Check TV set's functioning



At the end of this unit you will be able to:

1. Apply brand SOPs to check functioning of TV after installation process

Do

• Do confirm TV operations are normal as per the OEM's manual

Ask

- Ask participants to recapitulate learning from earlier sessions
- Ask them how to check whether the TV is functioning normally



• Demonstrate TV functioning normal during practicals



• Study and practice the OEM's TV installation & checking instructions

In any situation where your television is connected via digital cable or satellite box it is highly recommend-ed that you follow the below mentioned procedures

- Check cable connections both from the outlet and to the television.
- Connect the equipment to an alternate signal source. If issues persist with your digital cable or satellite issues persist when connected to other sources, please contact your service provider.
- Reset the cable/satellite box or other input devices by unplugging them from the power source, wait for 15 seconds, and then plug again.
- Press the 'Menu' button. If the menu displays correctly, the picture problem may be a source issue and you should check all of the connections and cables from your devices to the TV.
- If audio is O.K. on selected source but no video, check the video cable.
- Adjust the television controls. Try resetting all video and audio options to default as incorrectly set controls can cause problems with television. But do not reset or factory set without customer's consent as it will erase all customer's previous settings
- Select correct source to get the picture.
- Use the Channel select or Input select to switch the source. Tell the customer that his television may require service if...
- The set does not switch on when set is in standby and command is given from remote or panel to switch it on.
- He gets audio on the selected source but no brightness and no On-screen menu display (press 'Menu' or 'Volume').
- Check outlets by plugging in a different device.
- Check power cord connection at the back of the unit to ensure it's properly connected. Check power cord to ensure it's not broken or cut.
- Check the owner's manual before calling for service.
- Check the remote control and replace its batteries if necessary.
- The images on all channels are fuzzy or the picture is snowy but visible and audio distorted.
- An external device cable or cable connected to TV may be loose.

- Connect the cable directly to the TV set, if still distorted please call your cable/satellite provider. A black border frames the top, bottom or sides of the screen.
- The program is being shown in "letterbox" format, consult TV user manual or input device user manual.
- No service may be required if there is no sound or the volume is too low. In such a case the volume may be turned down or muted.
- Turn the volume up on the TV set.
- Turn off the 'Mute' function via the remote control or on your television. The audio has a distinct buzz or hum.
- The TV set's volume is adjusted to the top of its range. Input cables may be loose or improperly connected, ensure they are firmly connected.

Exercise:

1. What is ESD?

- 2. Why is it necessary to control ESD discharge?
- 3. What do you understand by Auto tuning?
- 4. What is the best place to install a LCD TV?
- 5. What tools are required to install a LCD TV on a wall?

Notes	
-	
-	
-	







Transforming the skill landscape



Unit5.1 – Block Diagram of CRT Based Television System Unit5.2 – Power Section SMPS Unit5.3 – Tuner Section Unit 5.4 – IF Section Unit 5.5 – Video Section Unit 5.6 – Audio Section Unit 5.7 – Common Faults

Unit 5.8 – Faults specific to different TV sets

Unit 5.9 - Safety Standards to follow



- Key Learning Outcomes 📃 🥙

At the end of this module, you will be able to:

- 1. Explain various sections of CRT TV as per block diagram
- 2. Identify circuits used in SMPS and their functionality
- 3. Explains functions of R.F. Amplifier, Local Oscillator & Mixer in tuner section
- 4. Explain video decoder functionality of IF section
- 5. Identify and explain functioning of various components in video section
- 6. Identify and explain functioning of various components in audio section
- 7. Diagnose fault root cause and their repair requirements
- 8. Carryout repair procedure of faulty section of CRT TV
- 9. Use industry best practices to maintain safety
UNIT 5.1: Block Diagram of CRT based Television system



At the end of this unit you will be able to:

1. Explain various sections of CRT TV as per block diagram

Do 🗸

• Show them some defective TV components & see if they can identify the defects

• Familiarise the participants with tools required for trouble shooting CRT TV

Ask

- Ask the participants to recapitulate learnings from earlier sessions
- Ask them to draw block diagram of CRT TV



• TV repair technician's is a skilled job

• Trouble shooting, identifying and repairing defective components requires lot of experience and skills

Demonstrate

- Demonstrate CRT TV trouble shooting using the block diagram during practicals
- Demonstrate the use of block diagram in TV defect elimination during practicals

Notes for Facilitation

- CRT TV block diagram helps in systematic problem solving
- Defect root cause identification & rectification is critical in putting dysfunctional CRT TV back in operation



UNIT 5.2: Power Section SMPS

Unit Objectives

At the end of this unit you will be able to:

- Explain the working principle of SMPS
- Explain the circuit diagram of SMPS

Do

- Show them different components in power supply system
- Show them SMPS applications

Ask

- Ask the participants to recapitulate learnings from earlier sessions
- Ask them the meaning of SMPS : Switch Mode Power Supply



- Uninterrupted power supply is major concern even in big cities
- Load shedding & mega blockages are also very common

Demonstrate



- Demonstrate SMPS components during practicals
- Let the participants try their hands on SMPS circuits during practicals

Notes for Facilitation

- Some of the states are overdrawing power from the power grids, resulting in shortages & power tripping elsewhere
- SMPS help isolate & select the power supply as required

Power Supply: There are different kinds of power supplies. A Power supply is required to supply different d.c. voltages to the electronic circuit.

These can be classified as under

- Unregulated
- Regulated: In this we have series and shunt regulated.
- SMPS or Switch Mode Power Supply



Fig 5.2.1: Block Diagram of SMPS

SMPS Circuit explanation:

- Block diagram a typical SMPS is shown . It has:
- An AC Mains (line) input and
- a regulated DC output.
- The output rectification and filter capacitor.
- A High Frequency switching section and
- A high frequency transformer, and
- Voltage control feedback via
- An opto isolator.
- The control circuit block has ICs / transistors containing the high frequency oscillator, pulse width modu-lation, voltage and current control and output shut down sections.

Working Principle of SMPS :

Here a high frequency square wave is generated to drive an electronic power switching circuit. This circuit converts the DC supply into high frequency, high current Pulsating D.C which is like AC. This pulsating D.C. or A.C. is converted into a DC output.

But this needs to be regulated. The high frequency AC produced during the conversion process is a square wave, using which, we can control the output voltage by means of pulse width modulation. The regulation of the output is much more efficient than in linear regulated supplies. Advantages of SMPS:

- Power consumption is low as heat losses are minimum
- As high frequency is used, transformer size is low. Disadvantage of SMPS:
- Failure is less but circuit is complex and fault finding may be difficult.

5.2.1: Working Principle of Television –

TV means Tele Vision ie seeing from a distance. It means TV signal transmission is happening at some place and TV signal reception and viewing is at another place which is distant from the place of transmis-sion.

The picture data is very complex and optical. In a scene there are infinite small number of picture elements also called "pixels". When this scene is to be transmitted, scanning of the scene has to be done. The optical data is converted to electrical signal and then transmitted element by element sequentially to cover a complete scene. Scanning is done very fast and the signal is then transmitted at the same time. For capturing a scene, a television camera is used which picks up the picture information and uses a photo

conductive material whose resistance varies according to the brightness of the scene. An electron beam then falls on this material and picks up the picture information on the photo conductive material and converts it into an electrical video signal. This signal then is amplified and then its modulation is done with the picture carrier (Amplitude Modulation).

The sound of the scene (whose video signal is captured) is converted into electrical signal using a micro-phone. This Audio Signal is amplified and then modulated (frequency modulation).

The amplitude modulated picture and frequency modulated sound signal are fed to a combining system from where the combined signal is fed to the transmitting antenna

Antenna:

First of all we have to receive this signal which is in atmosphere. The transmitted signal is sent into the atmosphere through electro magnetic waves. In old days this electromagnetic signal was trapped using signal receptors called Antenna. The antenna used to trap such a signal is called Yagi Antenna. Its diagram is shown below:

It is made of Aluminium pipes and shaped as shown in the diagram. The front rod is called "Director ". Its job is to direct the incoming signal to the "Dipole "which is the second rod. The third rod and / or all other rods after this are called "Reflector/s". Its / their job is to collect the signal which does not go to the dipole and reflect it back to "director " from where signal will again go to Dipole. The impedance of Dipole is 300 Ohm.



Fig 5.2.1.1: Antenna

It may be clarified that there is a difference between impedance and resistance. 300 Ohm impedance of dipole is the resistance given by the dipole to the electromagnetic signal current. But if you remove the cable from the two ends of the dipole and check the resistance, it may show continuity. If we remove the cable or flat twin lead from balun and check continuity, we should get 3 to 4 Ohms for a wire of approx. 10 Meters because copper wire is used there which is a very good conductor of electricity.

From Dipole the signal is sent to Balun using a 2 parallel cable or coaxial cable. The impedance of this 2 wire flat twin lead is 300 Ohms. But the impedance of Coaxial cable is 75 Ohms.

Balun:

It is also called the "Balancing Unit ". The impedance of Tuner where signal from Balun is fed is 75 Ohms. But if we are using flat twin lead whose impedance is 300 Ohms, we need to use a Balun just before tuner. So, the signal from parallel wires is given to one side of Balun. It has an iron core on which there are bifilar windings.

One side of Balun is at 300:75 so it balances incoming signal and other side of Balun is at 75:75 so it is again balanced while giving output to Tuner.



Fig 5.2.1.2: Inside of a Balun





Fig 5.2.1.4: A Balun

UNIT 5.3: Tuner Section



At the end of this unit you will be able to:

1. Explain functions of R.F. Amplifier, Local Oscillator & Mixer

Do

- Show them components in Tuner system
- Let them try their hands on the Tuner system components
- Ask
- Ask the participants to recapitulate learnings from earlier sessions
- Ask them to functions of RF Amplifier, Local Oscillator, Mixer

Demonstrate

- Demonstrate Tuner system fault diagnosis during practicals
- Demonstrate Tuner system typical defect rectifications during practicals

Notes for Facilitation

- Tuner system plays an important role in TV functioning
- Brightness & contrast are important for picture clarity

It has following three parts

- A. R.F. Amplifier
- B. Local Oscillator
- C. Mixer



Fig 5.3.1: An Electronic Tuner

R.F. Amplifier:

It is Radio Frequency amplifier. The RF waves are intercepted by the antenna. This signal after travelling in atmosphere through disturbances and external noise is very weak and is in Milli volts while signal required at CRT is of the order of 80 Volts. Thus the actual amplification of signal from Antenna to CRT is of the order of 80 K. After balancing in Balun, this signal has to be amplified so before further processing, it is amplified in R.F. Amplifier of Tuner

Local Ocsillator:

Here a frequency compatible to the signal required is generated. As shown in the table below,local oscilla-tor frequency for Channel 4 in Delhi is 101.15 MHz. For each channel, frequency of local oscillator is differ-ent.

Mixer:

The amplified RF amplified signal and local oscillator frequency are fed to a Mixer where these beat together and we get Intermediate frequencies for Picture and Sound.

Picture and Sound IF for Channel 4 of Delhi

Picture R.F. 62.25 MHz	Local Oscillator 101.15 MHz	Picture I.F. 38.9 MHz
Sound R.F. 67.75 MHz	Local Oscillator 101.15 MHz	Sound I.F. 33.4 MHz

Tab 5.3.1: Picture and Sound IF for Channel 4 of Delhi

The output frequencies of Tuner will always be as shown above i.e. Picture IF=38.9 MHz Sound IF =33.4 MHz

The frequency will be changed as per the channel one wants to see so that IF frequencies always remain same. If this is not done, we will have to design separate amplifiers and circuit for each channel which will be very cumbersome. To avoid this, local oscillator is used.

Compatibility:

In B &W TV, brightness information of a scene is done by Scanning. In colour TV, information of colour has also to be collected. There are 3 systems for this:

PAL B/G: Phase Alteration by Line

NTSC: National Television System Committee

SECAM: Sequential Error a Memoir

But for Colour TV Transmission, there are certain other requirements such that colour system can gener-ate a B&W picture on a B&W TV.

Also, if colour tv receives a B&W signal, it should generate a B&W picture.

To ensure that these conditions are met, colour information is encoded in a manner that it can be transmitted in the same channel bandwidth of 7 MHz. At the TV receiver, a colour decoder is used to decode the encoded colour signal.

Characteristics of Light:

From the Electromagnetic spectrum, we see that visible spectrum is around a frequency of 5*10^14 Hz. Human eye sees light when radiation from sun reaches the eye in correct proportion. As per Helmholtz, human eye has rods and cones. While rods see brightness, cones see colour. In color theory there are three primary colors: red green and blue, or its printed complements, cyan, magenta, and yellow A fourth "primary," black, is used for printed color.

Additive color:

The additive primaries red green and blue generate colors. The three colors are projected onto a screen in various intensities to produce all colors. Color on television and monitors is produced by three color "guns" corresponding to each additive primary. These produce color intensity based on a voltage level, from 0 to 255. Obviously, 0, 0, and 0 will produce black, or absence of color, and 255, 255 and 255 will produce white



Fig 5.3.2: Additive Color 1

This calculation can be done for colours which can be reproduced in a FPD. If the micro computer is of 8 bits, colours produced for Red=2^8=256 (2*2*2*2*2*2*2*2*2) Colours produced for Green=2^8=256

Colours produced for Blue=2^8=256 Colour shades which can be reproduced=256*256*256=16.77 Million But for CRT TV, we do not check the colours produced in this manner.

Note that if you project the additive primaries, say, from a spotlight onto a stage, a combination of two will produce a subtractive primary (illustration at right).

Red + green=magenta. Green + blue=cyan. Red + green=yellow. Red + green + blue=white, the whole spectrum.



Fig 5.3.3: Block Diagram TV Set 1



Fig 5.3.4: Additive Color 2



Fig 5.3.5: PAL-CTV General Block Diagram



UNIT 5.4: IF Section

- Unit Objectives

At the end of this unit you will be able to:

- 1. Explain function of IF (Intermediate Frequency) amplifier
- 2. Explain Video detector functionality
- Do
- Show them IF amplifier components
- Let them try their hands & get acquainted with IF amplification system



- Ask the participants to recapitulate learnings from earlier sessions
- Ask them functions of IF amplifier

Demonstrate

- Demonstrate use of IF amplification during practicals
- Let the participants learn IF amplification during practicals

Notes for Facilitation

- IF amplifiers raise signal levels in stereo system
- IF frequencies are lower than the RF

The signal received from tuner is still very weak so before further processing, it needs more amplification. For this, the signal is passed through 2 or 3 I.F. Amplifier stages for amplification. The PIF and SIF have been shown above. As already stated, the IF frequency is same for all channels. Picture IF=38.9 MHz

Sound IF=33.4 MHz

Difference in these =38.9-33.4=5.5 MHz

It is also called Intercarrier sound and this carries the sound signal.

Video Detector:

The signal from IF is now fed to a Video Detector which is a diode. It detects the video signal and feeds it to a Video preamplifier where the video signal is amplified. Part of this signal also goes to the sound stage which is explained after explanation of Video stage.

UNIT 5.5: Video Section

Unit Objectives

At the end of this unit you will be able to:

- 1. Explain functions of chroma section
- 2. Explain function of Micro Processor
- 3. Identify various circuits used in Video Section
- 4. Explain architecture and functioning of CRT
- 5. Explain functionality of Internal Degaussing and External Degaussing Coil

Do

- Show them functioning of CRT
- Show them degaussing coils



- Ask the participants to recapitulate learnings from earlier sessions
- Ask them functions of micro-processor
- Ask them to draw Video circuits

Demonstrate

- Demonstrate fault finding procedure in TV video system during practicals
- Demonstrate defect rectification procedures for TV video system during practicals

Notes for Facilitation 📕

• Degaussing coil neutralizes magnetic fields in the cathode ray tube. Tubes not having internal coil can be degaussed with the help of external coil. External degaussing coils are stronger than internal degaussing coils

The signal from Video Preamplifier is now fed to Video Out Put Transistor. Here the signal is again ampli-fied before being fed to CRT.



Fig 5.5.1: Signal Amplification

Chroma Section:

We get Y or Luminance Signal or black and white signal from Video output. This signal is then mixed with B-Y and R-Y Signals to get colours. It happens as under:

B-Y+Y=B

R-Y+Y=R

The colour equation is Y=.39R+.59G+.11B

When we get B and R, we can get G from Matrix.

Green is also not transmitted from transmitter. Also, in PAL, The complete Chroma signal is not transmit-ted. Only its sample 8-11 cycles called BURST is transmitted. At the receiver there is an oscillaitor of same frequency. This generates the PAL Subcarrier frequency 4.43 MHz to extract the burst and the colour infor-mation. From this, we get R-Y and B-Y. Green as already explained is then generated from Matrix as per the equation shown above.

Micro Processor:

CTVs use Micro processors which have many ICs built in eg. IF Amplifiers, Video detector, Sound Demodu-lator, Chroma section etc.

Memory IC:

A memory I.C. is used so that the selections made by the customer can be memorized.

Inter Connected I.C.s:

In this Microprocessor or chip, Tuner and Memory IC are interconnected through serial bus and serial data. These ICs and tuner keep communicating with each other as shown:



5.5.1: Colour Picture Tube

TV means Tele Vision ie seeing from a distance. It means TV signal transmission is happening at some place and TV signal reception and viewing is at another place which is distant from the place of transmis-sion.



Fig 5.5.1.1: Cathod Ray Tube



Fig 5.5.1.2: Basic Cathod Ray Tube

It has three electron guns , one each for Red, Green and Blue. As shown the screen has phosphor dots of these three colours. There is a shadow mask and the electrons pass through this mask and then they strike the respective phosphor dots as per the video signal.



Fig 5.5.1.3: Delta Gun Color Picture View

Internal Degaussing Coil:

As CRT is used in a CRT TV and it works because of movement of electrons. Certain problems can occur due to this movement. To avoid this a degaussing coil and a PTC circuit is built into the circuit. When the set is switched on, AC passes through the PTC and then into the degaussing coil. This degaussing coil is made of Copper wire and when AC passes through it, a strong magnetic field is created due to the AC. This magnetic field degausses or demagnetizes the outer part of CRT and avoids any patch formation. However, the patch may still be developed due to the following reasons:

- 1. There may be any magnetic or para magnetic items / things lying near the TV e.g. Radio or sound system, mobile phones, keys or any iron almirah etc. Patches may be developed due to this.
- 2. If the TV set is moved while it is on, it may develop patches.
- To remove such patches, switch off set for 15 minutes from Mains. Switch on the set after this time.
- 3. Patches may have been removed.

If still there is no improvement, check / replace the PTC and the coil.

If there is any magnetic field near the CRT TV, the electrons may be deflected from their original path resulting into colour patches on the screen. In certain such cases where patches developed may not be removed by the internal degaussing coil, an external degaussing coil may have to be used to remove these patches.

External degaussing Coil:

If the patches can not be removed by the internal degaussing coil, use an external degaussing coil. To use it, switch on the TV. Take the coil in front of the TV Screen. Switch on the coil and move in in clock wise direction 2 or 3 times in front of the screen. Now, switch off the coil and keep it away. Check the TV now. The patches may have been removed.



1.	Tuner
2.	Micro Processor
3.	Memory IC
4.	SAW Filter
5.	STR or MOSFET or Switching Transistor
6.	SMPS Transformer
7.	Bridge Rectifier
8.	Vertical O/P IC
9.	Error Amplifier
10.	Fly Back Transformer FBT
11.	H-o/p Transistor
12.	Linearity Coil
13.	Colour Picture Tube CPT
14.	Speaker

Tab 5.5.1: Important Components of a CTV

Chassis Sanyo Key Component Matrix

IC	1	N101 LA 76931 S7N58Y4E (Microprocessor)
Switching Transistor	1	V513 (2SC 4460M)
IS24C16A/D-3P	1	N702 (Memory IC)
LA78040B-E	1	N451 (Vertical IC)
2SA1015	1	V511 (Error Amplifier)
EL817B	1	N501 (Opto coupler)
CRYSTAL OSC. 32.768K	1	G701
H.DRIVE BCT-10FL	1	T401
TUNER EWT5F3PA43 E01W1	1	A101
FBT BSC25-N4014K	1	T402
2SC2383-0	1	V431 (H-driver transistor)
SMPS X Mer	1	T 501 (BCK 40-27 IEC-A)
CV203CZ TDA2003	1	N601 (Audio o/p)

Tab 5.5.2: Chassis Sanyo Key Component Matrix

From	Votage	То	То
SMPS Pin13,VD 551	110V	Collector of Ho/p transistor thru FBT Pins 4,2	Tuner for 33V
SMPS Pin11,VD 553	24V	Collector of H driver transistor thru LDT primary	Pin 2 and Pin 6 thru VD451 of Vert o/p LA78040B-E
SMPS Pin14,VD554,R550, V507	9V	Pin19 of Microprocessor as HVcc	
SMPS Pin 14,VD 554,R550, R571,R572 V508	7B5V		tuner supply
SMPS Pin14,R799 L701	5VSB	Pin35 of Microprocessor as VDD	
SMPS Pin16,VD 555	17V	Pin 5 of Audio o/p CV203	

Tab 5.5.3: SMPS Voltage Flow Chart Sanyo Chassis

SMPS Main Voltages:

SMPS Pin	Voltage
10	112 V from Diode VD 522 to collector of H Out Put transistor
8	13 V from Diode VD 523 to Pins 2 and 6 of Vertical Output I.C. and collector of H-Driver Transistor
14	17 V FROM Diode VD 526 to pins 2 and 6 of Audio Output I.C.
13	10 V from Diode VD 525
11	-13 V from Diode VD 521 to pin 4 of Vertical Out Put I.C.

Tab 5.5.4: SMPS Main Voltages

l	FBT Voltages Sanyo Chassis			
	From	Votage	То	And to
	SMPS Pin13,VD 551	110V	Collector of Ho/p transistor thru FBT Pins 4,2	Tuner for 33V
	SMPS Pin11,VD 553	24V	Collector of H driver transistor thru LDT primary	Pin 2 and Pin 6 thru VD451 of Vert o/p LA78040B-E
	SMPS Pin14,VD554,R550, V507	9V	Pin19 of Microprocessor as HVcc	
	SMPS Pin 14,VD 554,R550, R571,R572 V508	7B5V		tuner supply
	SMPS Pin14,R799 L701	5VSB	Pin35 of Microprocessor as VDD	
	SMPS Pin16,VD 555	17V	Pin 5 of Audio o/p CV203	

Tab 5.5.5: FBT Voltages Sanyo Chassis

IC 76931 Pin Description

Pin	Function	Pin	Function
6	Audio out	33	Crystal 32.768K
8	IF Vcc 5V	34	
10	ABL	35	VDD 5V SB
11	R,G,B Vcc 9V	36	Кеу
12	Rout	44	FBPin
13	Gout	50	4.43 MHz Crystal
14	Bout	61	RFAGC
17	VertIcal out	63	IF in
19	HVcc 9V	64	IF in
21	Hout		
23	Mute		
26	I.R.		
30			
31			
32			

Tab 5.5.6: IC 76931 Pin Description

5.5.2: Service and Design Data -

We have here given a method of entering service data of a particular chassis. Each Company provides its engineers with this data and its code. Using this data, an engineer can check and do many adjustments and resolve many issues in field without opening the back cover of the set. Same is true for LCD and FPDs. However, design data should not be tried for change and the companies give clear instructions to their engineers about it.

Method to enter Service Data of a particular CRT TV Chassis

- Make Vol zero
- Press Menu on remote
- Go to brightness and enter
- Press 6568
- Press sleep timer
- Again press sleep timer for next menu
- To exit, press jump

Different chassis use different Micon and accordingly the method of opening service and design data is different. A Micon or Micro controller is a customized microprocessor which carries out functions as per specifications.

Caution: Before changing any setting, note down current setting of TV in your diary so that if there is no improvement, you can set the data as it was before you changed it.

Signal Type	Signal components	Resolution	Connector type	Signal available from	CRT TV or FPDTV
RF	Picture, Sound, synch and blanking all in one cable or wire	240 lines	Balun or Adaptor	Antenna which receives signal from TV Transmitter	Both
AV	Y, C and control signals	270 lines and better than RF	RCA yellow socket and jack	DVD	Both
S-Video	Y and C	400 Lines		DVD, Camcorder	FPD only
Component Video	Pb, Pr and Y	500 or more lines	RCA 3 cables for picture and separately sound has to be connected	DVD	Both
VGA	15 Pin D Sub	VGA,XGA, WXGA etc.	15 Pin D Sub	PC, Laptop	FPD only
HDMI	HDMI	2Mega Pixel or 4K	HDMI Cable	HDMI Generator, Laptop	FPD only

Tab 5.5.2.1: Connectivity of signals for CRT TV and LCD TV

EURO Multi System (CZ):

R/F Mode	Video (A/V) Mode
PAL	PAL
NTSC 4.43	NTSC 4.43
-	NTSC 3.58
SECAM	SECAM

Multi System (CS-System):

In Multi System CTV we can use any kind of video (Color) signal from any country transmission through any mode

R/F Mode	Video (A/V) Mode
PAL	PAL
NTSC 4.43	NTSC 4.43
NTSC 3.58	NTSC 3.58
SECAM	SECAM

PAL System (CB-System):

In Single System CTV we can use video (Color) signal as follows

R/F Mode	Video (A/V) Mode
PAL	PAL
-	NTSC 4.43
-	NTSC 3.58



The channel Bandwidth is =7 MHz Video Bandwidth=5 MHz PAL Colour Signal frequency=4.43 MHz

For economy and to ensure that the colour signal does not disturb Video, only 8 to 11 cycles of the colour signal are transmitted. This contains the colour information of the scene. This is called PAL Colour Sub Carrier or Burst. At the receiver, there is a crystal oscillator which produces exact frequency of 4.43 MHz and through this the burst signal is received in the TV or LCD receiver and we get the colour information.

5.5.3: Cathode Ray Tube

The signal from Video Out Put is now fed to Cathode of CRT. If other circuits are working properly and a signal is fed to TV, same will be displayed on the screen. We have covered CRT in detail separately. In a CRT TV, there is a PCB mounted on the CRT. The PCB is shown in the figure. There are three video out put transistors which are on this PCB. Sometimes video out IC is also used.







Fig 5.5.3.3: Anode CAP which is fixed on Anode

TIY 5.5.5.2. CNT FC

Sound Stage:

In the Video Detector, the PIF and SIF beat together and we get the difference of these frequencies which is also called "Inter Carrier Sound ":

Picture I.F.=38.9 MHz Sound I.F.= 33.4 MHz Difference=5.5 MHz

In CTV, sound is separated before video detector to avoid harmonic generation from inter carrier sound frequency 5.5 MHz and PAL Colour Sub Carrier frequency of 4.43 MHz.

Sound Trap:

Now this 5.5. MHz signal has to go through a sound trap which keeps only the sound frequency and filters out all unwanted frequencies.

Sound Demodulator or Detector:

The sound signal had been modulated at the time of transmission and it is still in modulated condition. This modulated signal can not drive a speaker. So, first the sound signal is extracted or detected from this signal.

Sound Out Put:

The sound signal is given an amplification before it is fed to a speaker. From the speaker, we get the sound of the programme that we are watching.

UNIT 5.6: Audio Section

Unit Objectives

At the end of this unit you will be able to:

- 1. Explain sound section of a TV
- 2. Explain different types of sound system and its functionality
- 3. Identify various circuits used in sound system

Do

- Show them TV audio system components
- Let them try their hands on the TV audio system components



- Ask the participants to recapitulate learnings from earlier sessions
- Ask them functions of components in the TV audio ie sound system
- Ask them what is the frequency of sound audible to human beings
- Ask them what is infra sound
- Ask them what is ultra sound

Demonstrate

- Demonstrate TV audio system fault diagnosis procedure during practicals
- Demonstrate TV audio system defect rectification procedure during practicals

Notes for Facilitation

- Infra sound frequencies are lower than audible sound frequencies
- Ultra sound frequencies are higher than audible sound frequencies

Basics of Sound Human Audible Frequency: 20-20000 Hz 1 Hz=1 Cycle per second



Fig 5.6.1: Audible Frequency

Figure: Human Audible Frequency Range

As is clear from the above figure, humans can only hear sound whose frequency lies between 20 Hz to 20000 Hz. But to reproduce the sound and music exactly in the same way as it is say, in a concert, is in itself a challenge.

Sound frequency can be divided as:

Low, Mid and High. The following table shows the range specifications

Frequency	Name	Instrument	Type of speaker for sound reproduction
Low	Bass	Table, Drum	Woofer
Mid	Dialogue	Voice	Mid Range
High	Treble	Treble	Tweeter

Tab 5.3.1: Low, Mid and High. The following table shows the range specifications

MONO:

In mono all audio signals are mixed and routed through a single audio channel.

A mono signal output through 2 or more speakers



is still mono as each speaker reproduces same *Fig 5.6.2: Mono Signal* content of sound.

STEREO:

Here 2 or more separate channels are used to give natural distribution of sound.

When we listen to these 2 channels on separate speakers, we feel as if we are present at the event.



Fig 5.6.3: A 7.1 Speaker system

When the sound surrounds the listener from all sides, we say he is getting Surround Sound. In 7.1 system, we have 7+1=8 speakers. When it is a 5.1 speaker system, it means

There are 5+1=6 speakers which are as under FL: Front Left

FR: Front Right SW: SubWoofer Centre Speaker RL : Rear Left RR : Rear Right

This system is shown in the following diagram. With LCD or LED TV, where screen is very thin, speakers are very small and when LCD or LED is fixed in a big hall, a Sound System is required to get proper sound and a 5.1 system serves the purpose well. However, in CRT type TVs, the TV cabinet used was big and it was possible to have many speakers inside that cabinet. So, in some companies' models, there were Woofers, tweeters and also Mid Range speakers. Due to this, customer could get reasonably good sound output. Still it should be clear that there is a difference between sound output intensity or loudness and fidelity or quality. If one wants a good quality sound, one has to go for very high quality sound system cost of which can go upto several Lacs. As TVs are for the masses, a compromise has to be made by the manufac-turers so that they are able to give a product which can deliver good quality picture and good sound. If a customer wants still better results, he has to choose the costliest models.



5.5.5: PMPO -

This is not a technical term but is actually a Marketing Term. Actual power is R.M.S. or Root Mean Square.

P.M.P.O. means Peak Music Power Output

This term is used to claim Audio Output.

This is a multiplication of R.M.S. Sound Output of the CTV set by a factor.

P.M.P.O = R.M.S.*A Multiplication Factor

Multiplication factor to RMS is not fixed. This Multiplication factor is decided by the Marketing Team of any company.

Raster:

Till now, we have seen the signal path as per the block Diagram. We saw the Video signal path and the sound signal path. To, to see the video Signal, we used a CRT. But we need brightness on the screen so that we can view the picture. The brightness on the screen without any signal is called Raster. This Raster is produced because of the scanning done by electrons horizontally and vertically.

Horizontal Stage:

It has a Horizontal Oscillator, a horizontal driver and a horizontal out put. The frequency of the Horizontzl Oscillator is kept at 15625 Hz. The electrons coming from the cathode ray tube are deflected horizontally using deflection coils which are mounted over the neck of the CRT. The output of the Horizontal oscillator can not directly drive the Horizontal Output circuit so a horizontal driver circuit is used to connect the oscillator and the output. The output then drives the Horizontal yoke.



Fig 5.5.5.1: Horizontal Stage

Pin Number / Description	Voltage
HV	HV
Focus	Focus
Screen	Screen
10	200 V
8	3-4 V A.C. for heater or filament
9	ABL (Auto Brightness Limiter)
7	Ground

Tab 5.5.5: Voltages taken from FBT of a CRT Chassis for various stages.



Fig 5.5.5.2: Fly Back Transformer also called EHT Transformer and a Yoke

Vertical Stage:

Here we have a vertical oscillator and a vertical output. An IC can be used or transistors can also be used for vertical output stage. The frequency of vertical oscillator is same as frequency of AC in our country i.e. 50 Hz. If it is not kept so, picture will move up or down and we will get a Vertical Rolling.

AGC Circuit:

This is used to automatically control the gain of the incoming RF signal. It is a circuit between video out put and IF and RF amplifiers. Two AGC Voltages are generated:

RF AGC:

These voltages control then gain of the RF signal and we get optimum signal so that there is no distortion and noise.

IF AGC:

These voltages control then gain of the IF signal and we get optimum signal so that there is no distortion and noise.

Synch Circuits:

These are needed to control and correct the Horizontal and vertical frequency so that the picture being received in atransmission exactly follows the picture being transmitted from the Transmitter.

AFC Circuit:

This is used to automatically correct the frequency of the Horizontal Oscillator so that this frequency does not drift. If it drifts, you will find horizontal stripes on the screen without picture. This frequency pulse is taken from a winding of Fly Back Transformer and fed to the horizontal Oscillator. Horizontal oscillator is in the micro processor or in Jungle IC (This is the name of the IC which was used earlier and it contained Video and Horizontal and vertical oscillators).In still older sets, there were transistors used for Horizontal oscillator circuit.

SMPS:

The set needs power to operate and a SMPS is used to generate various DC supplies as per requirement. Each Company uses SMPS as per requirements of the chassis used in its models. DC Voltages that are generated are: 5V. 8V, 12V, 110V. Depending on circuit requirements, these voltages may vary.

Black and White TV Block:

We have already seen how signal travels in a TV receiver. To understand a CTV, we have to first understand how does a Black and White TV work. For displaying pictures, we need a medium. Here the medium is CRT or Cathode ray Tube. CRT functioning is separately explained in this book. For reproducing sound, there is a complete sound section.

In case of a CTV, The signal is received by antenna or is received through AV, RGB or USB depending on the type of source of signal selected. The signal, if received from Antenna, goes to Balun, Tuner, IF Section, Video Pre Amplifier, Video Output and CRT. As explained above, we have received the signal but to display it, we use CRT here. The cathode of the CRT emits electrons and the video signal goes to the grid.
A television receiver is an electronic device that receives audio and video signals from an antenna, cable/-satel-lite, or a video player and converts those signals into visible light rays and audible sound. A television receiver displays a picture as horizontal lines on the screen. Each line contains a series of red, green, and blue stripes. At viewing distance, the lines and stripes merge and we see a sharp picture in full color. Modern televisions rely on solid-state electronic components that require servicing by a trained techni-cian.



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UNIT 5.7: Common Faults

- Unit Objectives 🤎

At the end of this unit you will be able to:

- 1. Diagnose the defect and performance issues in various sections of CRT TV
- 2. Diagnose fault root cause and repair requirements of CRT TV
- 3. Carryout repair work of the defective section of CRT TV
- 4. Carryout service and maintenance requirements of CRT TV

• Show them common defects in CRT TV

- Show them how these defects can be rectified
- Show recurrence prevention actions for these defects
- Show them Service and Maintenance Manuals of some reputed OEMs

Ask 🦳

Do

- Ask the participants to recapitulate learnings from earlier sessions.
- Ask them to enumerate common problems faced by the customers in CRT TV
- Ask them to do root cause analysis of these commonly encountered problems
- Ask them recurrence actions to eliminate these causes giving rise to the customer complaints
- Ask them to enumerate service and maintenance requirements of CRT TV

Demonstrate

- Demonstrate trouble shooting : fault finding procedure for CRT TV during practicals
- Demonstrate defect repair procedure during practicals
- Demonstrate use of common tools and equipment during practicals
- Demonstrate how to check normal functioning of the TV after the repairs during practicals

- Study the common problems reported by customers on their TV
- Study the remedial actions

In a CRT TV there are some common faults which may occur in any CRT TV of whatever make. These can be classified as under:

Fault Finding in CRT CTV:

Given below is a table in which common faults that can occur in a CRT TV are listed. Alongwith it in anoth-er column, we have given the action / solution for trouble shooting these faults:

S.N.	Fault	Action
1.	Dead	Check AC 230V, Check / replace fuse, VDR, PTC, bridge, s witching transistor, H out put transistor, FBT
2.	Stand by	Check 5V SB at pin 35 of microprocessor, check power low / high at pin 30 microprocessor, V551, V552, VD507, V507, Check 9V at emitter of V507,9V at pin 19 of microprocessor, Check Memory IC and its SDA, SCL, Check H-out from pin21 of microprocessor, H-drive at base ofV431,24V at collector of V431, check whether emitter of V431 and V431 is properly grounded
3.	No Raster, sound o.k.	Check whether filament is glowing, if yes, check brightness, screen, if no check heater voltage, heater continuity
4.	No Picture	If sound is OK , it means fault is after video detector ie in Video output, check RGB Vcc voltages
5.	No Sound	Check Speakers, Audio out put pin, mute circuit, Sound supply in SMPS
6.	NPNS	Check if speaker is ok, if not, replace. If yes, check sound supply 17V, CHK audio I.C, check audio o/p form microprocessor and audio in at audio ic, check mute circuit

S.N.	Fault	Action	
7.	PNC/SNC	Check Antenna direction, cable, dipole, balun (for Antenna), cable, balun, adaptor, Tuner, SAW Filter, IF Circuit (for Antenna and cable connection both)	
8.	No Sound / Distorted sound on some channels on	Do as in 5 above or Check whether it is cable or DTH Signal, Check in another house or another cable, try to adjust from MFT	
9.	PNC/SNC on some channels	Check whether it is cable or DTH, Check in another hous or another cable, try to adjust from MFT. MFT means Mar Fine tuning. It is used to tune manually.	
10.	NP/NS from AV, Picture / sound ok from RF	Check AV out from microprocessor and follow the circuit ri up to AV out	
11.	NP/NS from component video	Check that connections are proper, Comp video has been selected in DVD ,Component video or RGB has been selected in TV/AV or Source.	
12.	Vertical Fail	Check vert supply 24V at pin 2 and 6 of Vertical O/P I.C., Check 9V at Pin 7, Check drive from microprocessor pin 17 and at pin 1 of Vertical O/P I.C.	
13.	Height less	Check vert supply 24V at pin 2 and 6 of Vertical O/P I.C Check 9V at Pin 7, Check drive from microprocessor pin17 and at pin 1 of Vertical O/P I.C.	

S.N.	Fault	Action	
14.	Remote not working	Check cells, check I.C., Infra Red receiver	
15.	Horizontal Rolling	It means Horizontal Synch is not locked. Check FBISO. These are fly back pulses of 15625 Hz and are used to control Horizontal Frequency.	
16.	Low contrast / dim pic	Check ABL Circuit. ABL means Auto Brightness Limiter. It is found between a FBT PIN and a Micon pin.	
17.	No colour	Check colour crystal 4.43 MHZ. In some sets there are 2 crystals and 4.43 MHz Crystal is separate. However, in some sets where a higher frequency crystal is used, 4.43 MHz is also derived from it. Either therer will be a dry soldering or else the crystal may have become defective and you may need to replace it.	
18.	Single colour miss	Check R,G,B out from Microprocessor pins.Check video o/p circuit-the particular transistor and its associated circuit. Normally, the transistor may have become defective or the resistor supplying supply to its collector may be open or high value.	
19.	Vertical Rolling	Vertical synch pulses are contained in the Video Signal. They are separated in Microprocessor and fed to the vertical oscillator. If there is some fault in this circuit, the picture will roll vertically. If this fault is seen, check the voltages on the relevant pins of vertical oscillator. If these are not OK, Replace Micon IC. Also, resolder the Micon IC.	

S.N.	Fault	Action
19.	Colour Patches	 Check if there is any magnetic field due to any paramagnetic thing lying near by or magnetic field due to any electric overhead wires or any speakers of any sound system, mobile phone. Remove the cause if there is any such magnetic field. Switch off the set and switch it on after 15 minutes. Patch may be gone. Check and replace internal degaussing coil, PTC etc. If these are OK, use an external degaussing coil to remove the patch. Check if convergence is OK. If it still does not go, you may have to replace CRT.

Tab 5.7: Fault finding in CRT TV

- If there are color patches in the image, they are caused by magnetization of the TV's metal parts or
 picture tube. CRT TV sets have a built-in device which does demagnetizing. It is called Internal
 Degauss-ing Coil and is mounted on the back of the CPT. If a customer gets patches on his TV, turn the
 set on for one to two minutes, then turn it off. Repeat several times at half-hour intervals. If this fails,
 demagnetize the picture tube by running an external degaussing coil across the screen with the set
 turned off and then take the coil away, switch it off and keep it aside. It will remove the patch. If
 patch is still not removed, you may have to degauss again. Otherwise, check / PTC. If that also does
 not work and inter-nal degaussing, check / replace internal degaussing coil. If that also does not work
 then fix some small magnets at the back of the CPT.
- If bright areas of a picture look silvery and details are indistinct, the picture tube is defective. When brightness is turned to low level, the picture will appear normal but dull. With brightness up, detail in white areas is lost. The picture may improve after the set has been on for an hour or more, but this means Picture tube is weak and needs replacem,ent.
- Low contrast
- This symptom can be divided as .
 - A: Too much noise or snow,
 - B: Simply poor contrast.

Cause: Low contrast and snowy picture can be due toa fault in the antenna or in the RF circuit. Plain low contrast is generally in the IF Amplifier stage to video output stage.

5.6.1: Trouble - Shooting Procedure

Find if low or less contrast is in all channels. If it is on only one channel, check if there is any loose or faulty contact in tuner stage. When there is a weak contrast in all channels, adjust the AGC from service data, both RF and IF AGC. If the fault is not rectified, check if the symptom is accompanied with snow or not. If the picture is snowy, check for an open circuit in the antenna / cable TV feeder cable or in the RF amplifier circuit. If the strength of the signal is very low, check the mixer, VIF, video detector and the AGC circuits. If the output voltage of the video detector is normal, check the video amplifier circuit.

Trouble-shooting the antenna circuit:

- An open or broken feeder cable connecting the external antenna and the receiver will result in less contrast and noisy picture. Check condition of the feeder cable by visual inspection and then check continuity using a Multi Meter. In areas near to sea, granules of salt adhering to the feeder cable will decrease the strength of the signal transmitted to the receiver. If this is suspected to be the cause, replace the feeder cable at least once a year or replace it with coaxial cable. Co-Axial Cable is also suggested in places where the house of the customer is on or near a very busy road and traffic density is very high. Co- Axial cable attenuates the noise due to the traffic.
- Please note that we will discuss TVs with manual tuning control and having transistors. This is done so that you understand the subject better. However, all present day TVs use Electronic Tuners and ICs in place of transistors.
- Due to this there is B&W picture even when there is color transmission. There can be following faults in this case:.
- 1) No color loss in all channels,
- 2) No color in a particular channel and
- 3) Intermittent color loss.
- 1. No color in all channels. A trouble in any of the following circuits may cause the symptom: bandpass amplifier, ACC, color killer, 4.43 MHz oscillator, 4.43 MHz output, burst gate and burst amplifier circuits.
- 2. No color in some or in a particular channel. This symptom is caused by a mis-adjustment in the local oscillator frequency or a loose contact in the channel selector switch.
- 3. Intermittent color loss. This is caused by a loose contact in the channel selector, mismatch between the antenna and the receiver or an intermittent operation of the 4.43 MHz oscillator.
- TROUBLE-SHOOTING PROCEDURE :
- In case of Micon which controls IF, Video, check / replace the Microprocessor and or the colour crystaloscillator.

Poor or Less color:

It can be called low, faded or less color. It is characterized by a weak maximum color reproduction. This symptom can be divided into two cases:

- 1) Low color in all channels
- 2) Low color in some channels

Weak color in all channels is caused by a breakdown in the ACC circuit or by a bandpass amplifier with a decreased gain.

Weak color in some stations is caused by a poorly tuned fine-tuning circuit, a mismatch between the antenna and the feeder cable, a defective antenna, a defective feeder cable or an old tuner.

TROUBLE-SHOOTING PROCEDURE:

- Set the color control at maximum and then adjust the fine-tuning circuit with the fine tuning knob to get maximum color for every station. If only some stations have weak color, check the matching of the antenna and the feeder wire. A mismatch between the antenna and the feeder cable will affect the receiver's reception and you will not get good color. But, if all channels have weak color and the color strength is not uniform, check and replace Micro processor. Check for a mismatch between antenna and cable by moving the cable slowly away from the antenna terminals. Check its effect on the color on the screen. If the color intensity changes as the foil is moved, then a mismatch between the cable and the antenna is confirmed. Such a mismatch can cause weak color reproduction. Trouble-shooting the ACC and the bandpass amplifier .
- A breakdown in the ACC (Automatic Color Control) circuit will reduce the gain of the first bandpass amplifier circuit. This will result in a decrease in the overall gain of the bandpass amplifier block. Check / Replace Microprocessor and associated circuit.

UNIT 5.8: Faults specific to different TV Sets



At the end of this unit you will be able to:

1. Explain faults specific to different TV Sets

Do

- Show them specific feature like child lock on TV
- Show them the use of password to unlock the child control
- Discuss trouble shooting on the special features
- Ask
- Ask the participants to recapitulate learnings from earlier sessions
- Ask them if they know any specific problems faced by the customers on their TV
- Ask them if their TV has parental control, child lock
- Ask if there are any specific problems on specific feature provided on some TV models

Demonstrate

- Demonstrate fault finding common standard procedure for TV special features during practicals
- Demonstrate the repair actions for such defective special features during practicals
- Demonstrate normal working after the fault elimination during practicals

Notes for Facilitation

- Modern TVs are coming with smart feature like computer, gaming, 3 D, sleep timer etc
- Maintenance & repairs on these special features require additional skills
- TV Repair Technician needs to continually upgrade his knowledge on what is new

We have shown above certain basic faults which occur in any CRT TV of any make. We may get different faults depending on the power supply and the picture and sound processing circuits and the CRT used. The faults may also depend on certain features incorporated in certain models e.g. TVs have child lock feature. However, if a customer uses child lock but forgets the password, it will be a fault for him and he will call the company to remove the fault.

UNIT 5.9: Safety Standards to follow

- Unit Objectives 🤎

At the end of this unit you will be able to:

- Use best working practices to avoid potential safety hazards
- Assess your responsibilities for safety of TV sets

Do

- Show them safety features provided in the TV
- Show them ESD specific packing, apron, hand gloves, tools

Ask 🔤

- Ask the participants to recapitulate learnings from earlier sessions
- Ask them to enumerate safety features required in CRT TV
- Ask them what is ESD : Electro Static Discharge and precaution are necessary avoid any damages

Demonstrate

- Demonstrate best working practices to avoid potential safety hazards
- Demonstrate responsibilities for safety of TV sets& persons

- Safety First
- Prepare SOPs : Standard Operating Procedures to tackle the safety hazards and to ensure safe work practices



Fig 5.9.1: Safety Circuits

- 1. Each CRT TV has certain special circuits and or components for the safety of the customer and the service person. If any of these components becomes defective, it has to be replaced with the same component or equivalent component as prescribed by the manufacturer. If it is not done, it can be hazardous. It is called a Critical component.
- 2. If any protective device has become defective, same has to be replaced as per recommendation of the manufacturer. If any protective shield is missing same must be arranged and fixed.
- 3. AC fuse must be of the exact rating as specified by the manufacturer. No wire or jumper should be used in place of fuse as it may lead to a fire in the set.
- 4. When reinstalling the chassis and its assemblies, all protective devices, including: nonmetallic control knobs and compartment covers must be put back in same manner because these will protect the user from shock, if any.
- 5. There should be no holes / slots, cabinet openings from where one is able to insert fingers and contact dangerous voltages. Such openings include the spacing between the picture tube and the cabinet mask, very wide cabinet ventilation slots, or back covers not fitted / screwed properly.

6. Leakage Current Hot Check .

Warning: A leakage-current tester or a metering system should be used to check the leakage current.

7. After assembling the unit, the AC power cord plug should be directly inserted into the power socket. Measure the current between a known earth ground (metal water pipe, conduit, etc.) and all exposed metal parts, including: antennas, handle brackets, metal cabinets, screw heads and control shafts. The current measured should not exceed 0.5 milli amperes. The same process should be repeated by reversing the power-plug prongs in the AC outlet.

8. Antenna Cold Check:

Disconnect AC plug from the AC source. Now, connect an electrical jumper across the two AC prongs. Connect one lead of the ohmmeter to an AC prong. Connect the other lead to the coaxial connector. It should show an open circuit.

9. X-ray Limits:

The picture tube is especially designed to prohibit X-ray emissions. To ensure that there is no x-ray emission, a defective CRT should be replaced only with a CRT as recommended by the manufacturer or an equivalent tube. After replacement, the picture tube shields and mounting hardware also need to be reinstalled because they also provide protection from X-rays.

High Voltage Limits:

High voltage must be measured each time servicing is done on the B+, horizontal deflection or high voltage circuits.

- Correct operation of the X-ray protection circuits must be reconfirmed whenever they are serviced.
 To ensure that the specified limits are not exceeded, each of the special components needs to be checked
- 11. The customer or the service engineer should not try any design changes in the circuit as it may change the load of the circuit and may lead to malfunction / fire.

Hot Chassis Warning:

Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord. If an isolation transformer is not used, these units may be safely serviced only if the AC power plug is inserted so that the chassis is connected to the ground side of the AC source.

To confirm that the AC power plug is inserted correctly, do the following: Using an AC voltmeter, mea-sure the voltage between the chassis and a known earth ground. If the reading is greater than 1.0V, remove the AC power plug, reverse its polarity and reinsert. Re-measure the voltage between the chassis and ground.

Some TV chassis have a secondary ground system in addition to the main chassis ground. This second-ary ground system is not isolated from the AC power line. The two ground systems are electrically separated by insulating material that must not be defeated or altered.

- 15. Components, parts and wiring that appear to have overheated or that are otherwise damaged should be replaced with parts that meet the original specifications. Always determine the cause of damage or overheating, and correct any potential hazards.
- 16. The original lead dress, especially near the following areas: Antenna wiring, sharp edges, and especially the AC and high voltage power supplies must be followed. Pinched, out-of-place, or cut wiring must be corrected / replaced. The spacing between components and PCB should be kept same.
- 17. There should be no damage to AC power cord. The wires and components should not touch such parts which become heated during running of TV.
- 18. Use safety goggles with side shields if CRT has to be replaced.
- 19. Product Safety Notice:

Some electrical and mechanical parts have special safety-related properties and if a different component is used when one such component becomes faulty, the protection circuit may not work.

Exercise:

- 1. In case of PNC / SNC fault in a TV, what will you check?
- 2. What is PAL Colour sub carrier frequency?
- 3. What voltage is given to anode of a colour picture tube?

Notes 🔳	
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Transforming the skill landscape



6. Repair Dysfunctional Flat Panel Display (FPD) TV set

Unit 6.1 – LCD and LED Television System Unit 6.2 – Controls and features Unit 6.3 – Common Faults Unit 6.4 – Faults specific to different Television System Unit 6.5 – Safety Procedure to follow



- Key Learning Outcomes

At the end of this module, you will be able to:

- 1. Identify various sections of flat panel TV set
- 2. Apply cleaning method of flat panel TV set
- 3. Explain and use various features of flat panel TV set
- 4. Diagnose the defect and performance issues in flat panel TV set
- 5. Diagnose fault root cause and repair requirements of flat panel TV set
- 6. Carryout repair work of the defective section of flat panel TV set
- 7. Carryout service and maintenance requirements of flat panel TV set
- 8. Use best working practices to avoid potential safety hazards

UNIT 6.1: LCD and LED Television System

- Unit Objectives 🮯

At the end of this unit you will be able to:

- 1. Explain difference between LCD and LED TV set
- 2. Identify units in flat panel TV set
- 3. Apply cleaning method for LCD panel



• Discuss advantages of FPD : Flat Panel Display

• Show them samples of LCD, LED TVs

Ask 🖳

- Ask the participants to recapitulate learnings from earlier sessions
- Ask them difference between LCD & LED TV

Demonstrate

- Demonstrate TV set screen cleaning procedure during practicals
- Demonstrate differences between LCD & LED TV during practicals

- Use block diagrams to explain the LCD / LED TV
- Dirt accumulation on TV screen affects viewing, hence cleaning the screen is required



Fig 6.1.1: Led TV System Block Diagram



It can be called low, faded or less color. It is characterized by a weak maximum color reproduction. This symptom can be divided into two cases:

1. Product lifetime can be shortened when it is used under conditions of high temperature and humidity.



2. When it is used at low temperature of 100 C or lower, response time and brightness are affected in such a way that the proper display may not be obtained

3. When exposed to drastic fluctuation of temperature (hot cold or cold to hot), the product may be affected, specially, drastic temperature fluctuation from cold to hot, produces drew on the surface which may affect the operation of the polarizer and product.

Fig 6.1.3: Product Life Time



Fig 6.1.4: Environmental Consideration

1	Power Supply Card
2	Main Card orTuner Card
3	Invertor Card (In smaller sets it is on power supply card)
4	IR Card
5	Panel Key PCB
6	Panel
7	Speakers
8	Logic card on Panel
9	LVDS Connector

6.1.2: Method Of Cleaning LCD Panel

- 1. Switch off the set. If the screen is dark, it will be easier to see the areas that are dirty or oily.
- 2. Use a dry soft cloth, wipe the screen very gently from right to left & left to right, not in circular motion.

i) use the microfiber soft cloth.

- ii) Soft white cloth commonly used for cleaning the glasses of Photocopier Machine / Scanner etc.
- 3. If the dry cloth does not completely remove the dirt or oil stains from the panel, do not press harder in an attempt to scrub it off.

Pushing directly on the LCD screen can often cause permanent pixels damage. In such situation, try the following steps:

- i) Take 2-Pieces of soft cloth. First Use a soft damp cloth (dip in mineral water). Gently wipe the Panel surface with damp cloth & immediately wipe it dry with a soft dry cloth.
- ii) If there are some hard figure prints or greasy stains on the panel which is difficult to remove, use damp cloth in circular motion & immediately dry polish with the other cloth.

Wipe from right & then left to right and doing this get to the bottom of the screen.

- iii) For dirty stains, one can use diluted white-vinegar by mixing 50% water & 50% vinegar.
- iv) Many companies sell cleaning stuff in spray containers for Flat-screen monitors but the vinegar mixture is easy to use& not harmful.
- 4. The plastic cabinet surrounding the screen can be cleaned with any multipurpose cleaner but avoid contact with the screen itself.
- 1. Do not use paper, tissue paper, or any cloth for wiping the LCD screen. Such materials can cause scratch-es on the screen.
- 2. Do not use cleaning agents containing ammonia, ethyl alcohol, acetone, toluene, ethyl acid, or methyl chloride. These can react with the LCD screen and damage it.
- 3. Do not put any liquid spray on the LCD screen otherwise it can enter the inside of the TV and damage the circuit inside it.

Voltage Distribution in a LCD TV:

S.N.	Supply Voltage	Description
1.	+5 V Stand by	It is available at 5V Stand by position and goes to IR, Display LED, Microprocessor and Memory
2.	+5 V Power	It becomes available when PS on is received from microprocessor
3.	+12V	It becomes available when PS on is received from Mains card and goes to invertor card for smaller screens.
4.	+24V	Same as above
5.	PS On	Power Supply On +5V and 12 V released only when PS On command is received from Tuner Card
6.	BL On	Back Light on pulse
7.	Panel Power	Panel becomes operative after receiving this voltage

Tab 6.1.1: Voltage distribution in a LCD TV

6.1.2: Plasma Display Panel

Plasma consists of a collection of free-moving electrons and ions - atoms that have lost electrons. Energy is needed to strip electrons from atoms to make plasma. The energy can be of various origins: thermal, electrical, or light (ultraviolet light or intense visible light from a laser).

Plasma:



Fig 6.1.1: Plasma Display Panel

UNIT 6.2: Controls and Features



At the end of this unit you will be able to:

1. Explain and use features of LCD TV set



- Show the participants LCD, LED, Plasma TV sets
- Let them learn & understand the new feature

Ask 🦳

- Ask the participants to recapitulate learnings from earlier sessions
- Ask them to enumerate features of LCD TV

Demonstrate

- Demonstrate LCD, LED & Plasma TV features during practicals
- Demonstrate screen procedure during practicals

- Study common customer complaints in LCD TV
- Study root cause analysis and rectification of these defects

Features of a LCD TV:



- Digital Noise Reducer, Hotel Mode, Programme Name
- Reminder Timer/Channel, Sleep Timer, On/Off Timer
- Programme Skip, Quick View, Freeze, Clock
- Volume, Tuning, Panel Lock

Fig 6.2.1: LCD TV

Tuning:

Commo

• 200 Programme, FS Tuning (FS means Frequency Synthesised)

Picture:

- 4 Picture mode (Std., Mild, User, Dynamic)
- 3 mode color temp control, Zoom
- Back light adjustment, Digi Comb Filter
- DCRE (Digital Colour Reality Engine)

Audio:

- 4 sound modes, 10Wx2(RMS), 2 Speakers, Equalizer
- Auto Volume Leveller, Bass & Treble Balance

Connectivity:

- S Video in, VGA in, PC Audio in, 2 HDMI, RF in, AV in,
- DVD Compatible

Specifications:

- 1366x768 Resolution
- 16:9 aspect ratio
- 16.7 million display color
- 30000:1 super contrast ratio
- 500cd/m2 brightness
- 6.5 ms response time

Before starting service the engineer should listen to customer, observe and check himself and if required, try the following steps. This applies to both CRT and LCD Set: Before calling for the TV repair service, there are many things customer can do himself to eliminate or reduce the cost of tech-nical repair. The tips given here apply to both flat-screen television repair and tube-type television. These tips can also be used for dealing with common problems such as electrical cord repair, remote control repair and others.

	Symptom		Cause	Action
Power	Picture	Sound		
Dead / No Power	No	No	No AC from socket.	Check AC in socket / fix plug
Stand by only red light on	No	No	Remore or panel key may not be working	Try with panel key or remote key. If not O.H customer should call service
ОК	Picture not clear	Sound not clear	Check Antenna direction, ant wire, cable, Balun, dish connection	Only one TV to be run on one connection. Antenna wire not too long or coiled.Check a a neighbour's house with same cable / dish connection. If OK there, call cable / dish operator.In case of disg, check for weather, obstruction in path of signal
ОК	Picture not clear	Sound not clear	In rainy season, signal from dish may not be received	Wait for rains to stop and or call dish operator
ОК	Multiple pictures / Ghost	ОК	Antenna direction wrong	Correct direction.
Interference	Lines on picture	Abnormal Sound	Electrical / Road disturbance	Check for any electrical or road disturbance

Simple solutions which customer or engineer can check if a CRT TV or LCD TV is faulty

Symptom			Cause	Action
Power	Picture	Sound		
ОК	ОК	No sound	Volume may be on zero	Check / Correct volume settings from main menu/ service data for service engineer, Mute
ОК	No brightness on screen	Ok	Brightness key	Check. Correct brightness, contrast settings, back light in case of LCD TV
ОК	No Colour	Ok	Colour settings	Check / correct colour system as PAL 4.43mHz for PAL, correct colour settings
ОК	Colour Patches	Patches on picture	Magnetic Field	Switch off set for about 15 minutes from mains. After this switch on again. It may be OK now otherwise remove any magnetic disturbance ant do degaussing if it is a CRT TV.
Remote not working	ОК	ОК	Weak cells in R.C.	Replace cells, clean remote eye glass from front, check distance and angle of operation, should be as per specs of company

Symptom			Cause	Action
Power	Picture	Sound		
No tuning	Picture OK on one channel only	Only one channel working	Set may be in child lock	Remove child lock
No function	No	No	TV Lock	Remove TV Lock
Panel not working	OK with remote	OK with remote	Panel Lock	Remove Panel Lock
No picture / sound when DVD is played	No	No	AV Lock	Remove Panel Lock
Clock is displayed on Screen	Ok	Ok	Timer Setting	Correct setting in Timer Menu or as per Company

Tab 6.2: TV Fault Symptom, Cause & Action



Fig 6.2.1: Power Supply and Inverter Connector



Fig 6.2.2: Voltage Chart - LCD TV





Fig 6.2.4: Panel failure mode

In the above figure are shown certain cases of Panel failure.



UNIT 6.3: Common Faults

– Unit Objectives

At the end of this unit you will be able to:

- 1. Diagnose the defect and performance issues in flat panel TV set
- 2. Diagnose fault root cause and repair requirements of flat panel TV set
- 3. Carryout repair work of the defective section of flat panel TV set
- 4. Carryout service and maintenance requirements of flat panel TV set

Do

- Discuss customer complaints, their causes & rectifications
- Discuss OEMs' Maintenance & Service manuals



- Ask the participants to recapitulate learnings from earlier sessions
- Ask them to enumerate common customer complaints on LCD TV

Demonstrate

- Demonstrate LCD TV trouble shooting procedure during practicals
- Demonstrate regular maintenance steps during practicals

- Samsung TV market is about 20 % globally
- Defect recurrence prevention actions are required to keep up the market share

Trouble Shooting:

Trouble shooting can be done in the following 4 ways. It should be noted that these methods can be applied to any Electronic product or any product using Electronic circuitry. These are:

- 1. Substitution: This is the oldest method and is used by all technicians. New technicians use it because they still are not clear how to detect the symptom and how to proceed for trouble shooting. In this method, technician keeps on changing parts till he is able to rectify. This way some times the set may be repaired but it may take too much time and repair may be too costly for the Company. So, to avoid it, the method of isolation must be used.
- 2. Isolation: In this the fault is isolated stage wise and then sub circuit and then component wise. This is one of the best methods of rectification. In this first the faulty stage is identified and then the faulty component is traced and replaced. It is very important to understand and know the block diagram and signal and power flow. If these are clear, one can isolate the defective stage and part and replace the defective part.
- 3. Signal Injection: In this an external signal is injected at an appropriate point to check the behavior of circuit with that signal. If circuit improves with that it means that there is some problem with the signal in the set. If that is corrected, set will become O.K.
- 4. Checking wave shapes: If fault can not be rectified by any of the above methods, wave shape is checked at check points and this way the faulty component can be traced and repaired.

– 6.3.1: Repair Flat Panel TV Sets ——

LCD Faults & Symptoms:

While there can be hundreds of faults and their symptoms, we summarize here some of the standard faults occurring most frequently in LCD TV of any make. These faults have been tabulated for easy under-standing of reader. Symptom is what we see, action is what can be done to solve the issue.:

Trouble Shooting a LCD TV:

S.N.	Symptom	Action
1.	LCD dead,LED not glowing	Check AC power, Fuse, Bridge, MOSFET, Power supply card
2.	LCD in stand by, Red LED glows but does not change colour when set is switched on	Check 5V line, Check if PS on signal being received from Main Card
3.	Red led glows but no back light when set switched on	Check 24V/12V,BL pulse from main card, invertor card
4.	Stand by.Red light changes to blue on command but returns to red again in 2-3 seconds	It menas there is a shorting in the load, Check and remove shorting.
5.	No brightness on screen but sound OK, back light OK	It means Invertor OK, Check LVDS supply and data
6.	No brightness on screen but sound OK, No back light	Check B+ 5V, Back light on pulse,12V LVDS, Back light adj 5V, CCFL, Panel
7.	Picture is dull, Sound and back light OK	Check LVDS Mapping, panel selection in service data, load sw
8.	Vertical line or lines on picture	Check for loose contacts in LVDS connector, socket, FPC from logic card to panel, check / replace panel

S.N.	Symptom	Action
9.	Horizontal bars	Check / replace CCFL, Panel
10.	Noise lines on picture but sound OK	It is due to sparking
11.	No Sound, Picture is OK	Check Audio O/PIC supply

Tab 6.3: LCD Troubleshooting

Service and Design Data:

This data is very important and useful for service personnel. Each Company provides its engineers with such data and its code. Using this data, an engineer can check and do many adjustments and resolve many issues in field without opening the back cover of the set. Same is true for CRT TVs and FPDs. Using this data engineers can check, adjust picture, contract, brightness, backlight intensity etc. and can also check / load SW as in some cases data loading through USB can be done by first entering service data.

However, before changing service data values, engineer should note the current data in his diary so that if the fault is not resolved by change of data, he should restore the original data.

UNIT 6.4: Faults specific to different Television System



At the end of this unit you will be able to:

- 1. Explain faults specific to different flat panel TV Sets
- Do 🗸
- Discuss why some TV brands more popular than others
- Discuss modern smart TV feature like computer / laptop
- Ask 🥘
- Ask the participants to recapitulate learnings from earlier sessions
- Ask them about specific problems faced on different TV models



- Demonstrate smart TV features, their faults and corrective actions during practicals
- Demonstrate smart TV trouble shooting during practicals

- Smart TVs are increasingly popular
- R & D adds new features to enhance customer delight

We have shown above certain basic faults which can occur in any Company's any model FPD TV. However, there are certain faults which can be Company specific. These can be due to design, Quality Control issues, Model specific or solution / microprocessor specific, production issues, parts specific or Company's service policy or lack of technical expertise by the field technician. These can also be due to Inward Quality Control known as IQC or Outward Quality Control known as OQC. Many Times in some companies, if a specific part is not available, R&D / QC may allow use of an equivalent part. But if that part has not been tested and Service also has not been trained about its use, the part may fail in field. If ESD safety measures are not used in production, stores and service even then parts may totally fail fail or may fail and behave intermittently. In LCD / LED TV In LCD TV, such faults can occur due to

- 4. Panel Faults: If a particular panel is chosen and the panels have some inherent defects
- 5. Software or Firmware Faults: The firmware is Company specific and customized as per its requirements. The set may hang or function intermittently or behave erratically if there is a firmware fault.

Apart from this there can be different faults in LED, OLED and Plasma TV because of difference in power requirements of these sets and also because of different methods of backlighting eg. Edge lighting in LED TV while OLED and Plasma have their own light and do not use any backlight.
UNIT 6.5: Safety Procedure to follow

- Unit Objectives 🧖



- 1. Use best working practices to avoid potential safety hazards
- 2. Assess your responsibilities for safety of TV sets



• Show common safety signages

• Do safety audits on the campus

Ask

- Ask the participants to recapitulate learnings from earlier session
- Ask them to enumerate the common safety hazards

Demonstrate

- Demonstrates safe work practices
- Demonstrate safety hazards and how to overcome them

- Safety First
- Work on safety audit finding
- Ensure safe & secure work practices

Apart from the safety procedures discussed in other sections. ESD safety has also to be considered during repair of LCD / LED TVs. ESD means Electro Static Discharge. ESD Safety has been explained in Unit 4.2. There are other safety considerations which must be taken care of either at Company workshop or at Customer's place. First of all, we will see what are the hazards:

- Electrical: Please check for any loose wires, wires hanging overhead or wires / electric cables lying on the ground in the workplace. Also, check and ensure that the AC socket where the LCD TV is plugged is not loose and there is no sparking asit can lead to fire.
- Liquid Spillage: Check for any liquid spillage on the floor.
- Keeping children away: If you are at customer's house for repair, you may request him to keep children and elders away as you will be working on high voltage.
- Soldering Iron: Keep your iron safely in a stand and in a side so that no one can touch it even by accident.
- Gas Leakage: Be alert for any gas leakage.

- 6.5.1: FAQ on CRT and FPD TV –

- Q.1 What is composite video?
- Ans. 1) Composite video is the basic Video Signal available from a Video Source e,g. Camcorder, Player, Video out from TV, Analogue set top box of Dish TV, DVD Player.

The composite video Signal is connected using a single-core shielded cable & Yellow Color RCA Jack or Socket (Radio Company of America) as shown in figure below:



Fig 6.5.1: Composite Video Connectors and Cable

This type of signal is composed of various components as listed below:

- 1) B & W video information
- 2) Chroma (Color) information &
- Control Signals (Horizontal & Vertical Synchronization & Blanking Pulses). Its Picture resolution is 240 to 270 Horizontal lines only. Therefore the Quality of picture is similar for VCD, VCR, TV-Transmission & SD (Standard resolution) Video Games etc.But this picture quality is better than that of RF.

Q.1 Define a Pixel

- Ans. 2) Pixel stands for Pix El i.e. PICTURE Element. Pix is short form of picture and El is short form of element. Pixel is the smallest element or point of a picture within the displayed video or within the display system like CRT or FPD.
- Q. 3 Define resolution?
- Ans. 3) Resolution is normally defined in 3-Different ways as:
 - a) Horizontal Resolution: It defines define picture quality of CRTTV, FPD, Analog Video Camera, DVD Players)
 - b) Vertical Resolution (This term is rarely used and is of very less significance for viewing)
 Pixel Resolution (Essentially used to define picture quality in case of CDT, TFT-LCD Monitors, PDP,
 - c) LCD-Projectors, HD-Games & Computer generated graphics.

H-Resolution: It is the total number of visible black vertical lines displayed on a TV screen, while the lines are placed in Horizontal Direction on a white background

Vertical-Resolution: It is the total number of visible black Horizontal lines displayed on a TV screen, while the lines are placed in Vertical Direction on a white background.

Commonly this figure is not spoken about as the same will always be smaller then the H-Resolution.

Pixel Resolution: It is defined as the angle subtended by the pixel on the eye so that the eye can resolve or view it.:

Native Resolution: It is the total no of pixels available on a Display Panel .

Example: If an LCD Panel contains 1920 Pixels in H-Direction & 1080 Pixels (Dots) in vertical direction, then the Pixel resolution of that LCD Panel = (1920 X1080) Pixels = 2 Mega Pixels (Approx., Actually it is=2.07 Mega Pixels)

Picture Resolution: It is the number of pixels contained in the Picture signal.

Example: 720 X 1024i: This means the picture is composed of 720 lines & each line contains 1024 dots (Pixels). i stands for picture processed in Interlaced scan system..

Q.4 What is RGB & what is VIBGYOR?

Ans. 4) RGB (Red, Green & Blue) are the primary colors through which all colours are reproduced in CTV by colour addition.

VIBGYOR stands for seven colours of Rainbow.

Therefore in analog & digital video systems, it is sufficient to deal with only primary colors, as these colors mixed at different mathematical proportion can produce any color available in nature including Silver & Gold.

VIBGYOR is Violet, Indigo, Blue, Green, Yellow, Orange & Red (VIBGYOR).

But in a Colour TV, all seven colours of rainbow are not used to show colours. Instead only three primary colours e.g. Red, Green and Blue are used in the following proportions: Red 30%

Green 59% Blue 11% Y=.30R+.59G+.11B

Q.5 What is S-video?

Ans. 5) S-Video expanded as Super Video or separate video. In this the Picture resolution is as much as 400 Lines. It is analogue and is better than AV.

A special cable with 2-Core shielded wire is used with 4-Mini DIN socket as shown in figure.







Fig 6.5.2: S-Video Socket

The video signal has 2 parts:

a) Y – Luminance Signal (B&W and Control Signal) &

b) C - Chrominance (Chroma or Color Signal)

There are 4 pins in this: One for Y, second for Y ground, third for C, fourth for C ground. This signal can be available from Hi-8 Camera, DVD-Player, Set Top Box etc. Advanced models of CTV, PDP, LCD-TV & Projection TVs may have such input facility. Q.6 What is component video?

- Ans. 6) In this Video signal has three components. Component Video has more resolution than S-Video. In this Chroma-Signal is split into 2-Parts as:
 - 1. Blue Color Difference Signal (B-Y) also known as Pb (Port Blue) or Cb (Chroma Blue). Blue coloured jack and port are used in this.
 - Red Color Difference Signal (R-Y) also known as Pr (Port Red) or Cr (Chroma Red). Red coloured jack and port are used in this
 Y-Signal or Luminance signal or B&W Signal is the third component.

Important:

Component Video is both Analogue and Digital: In both Resolution, Representability, Signal processing are different. Picture Resolution in Analog Component Video: 500 ~ 800 H-Lines Picture Resolution in Digital Component Video: 720i/p ~ 1080i

- Q.7 How to connect component video?
- Ans. 7) In Component Video three Cables with RCA Jack / Socket are used only for Picture& two RCA - Connectors separately for Stereo Sound (two speakers) as shown :



Fig 6.5.3: S-Video Socket

Q.8 What is picture resolution of component video

Ans. 8) Picture Resolution from Components Video can be as high as HD-TV Resolution & beyond right from the most basic 240 Horizontal Lines as follows:

ANALOG:	500H-Lines from DVD/DVD-R, Y, Pb, Pr
	800H-Lines from VCR
	Standard Vision 1024-H X 768-V (Equivalent to XGA)
	Wide Vision 1280-H X 768-V (WXGA), Equivalent to 32-Bit Computer
	Generat-ed Extended Graphics Array
DIGITAL :	HD-1 & 2: 720i / 720p/ 1080i from HDTV-Set Top Box. Blu ray-DVD

Q.9 What is RGB-video?

Ans. 9) RGB-Video is Computer generated Video through 15-pin D-Sub connector. This is Analog Video Signal

The horizontal resolutions for such type of video varies from 320-Lines to as high as > 2300-Lines This picture resolution is classified as VGA, XGA, UGA etc.

Q.9 What is full form of VGA,XGA, W-XGA,& UGA

Ans. 9)

Short Name	Expanded Name & Resolution	Resolution with Aspect Ratio	
VGA:	Video Graphics Array	640 X 480 4:3	
S-VGA:	Super – VGA	800 X 6004:3	
XGA	Extended Graphics Array	1024 X 768 4:3	
W-XGA:	Wide Extended Graphics Array	1280 X 768 16:9	
UGA:	Ultra Graphics Array	1720 X 968 16:9	

Q.11. What do you understand by Frame & Field?

Ans. 11) A complete scene is recorded or filmed in a frame . It is like one page of a book. In CCIRB, a frame has 625 Lines. This frame is further divided into two fields-Odd and Even In odd field only odd line numbers 1, 3, 5 --- etc are shown. Odd field has 312.5 lines. In even Field even line Nos. 2, 4, 6, 8 --- etc are shown. Even field also has 312.5 lines.

Q.12. Expand NTSC, PAL, & SECAM?

Ans. 12) NTSC National Television System Committee (American System) PAL Phase Alteration by Line (German System) SECAM Sequential Color a Memoir (French System)

Q.13. What do you mean by Progressive Scanning?

Ans. 13) In Progressive scanning all the lines in a Frame are scanned systematically one after another.

Q.14. What do you mean by Interlaced Scanning?

Ans. 14) In this a frame is divided into 2 fields-odd and even. First odd field containing odd number of linesis displayed. After this even field containing even no of lines is displayed.

Q.15. Which is better; 100HZ TV or a 50 Hz conventional TV?

Ans. 15) 100Hz TV is a flicker free TV so it is better while the conventional TV is has flicker.

Q.16. How is aspect ratio defined for a TV?

Ans. 16) Ans. 16. This ratio describes the geometrical shape of a TV or a FPD. All our movements are in horizontal direction so the aspect ratio is so kept so that width is more than height and our eyes can comfortably see a scene.

Dimension Standard, specifies the proportion or Ratio of the Width & Height of a TV or FPD to give a similar look irrespective of the size of a Display Panel. Two Standards are in common practice these days:

4:3

16:9

Q.17. Explain RCA & DIN socket.

Ans. 17) RCA- Socket developed in US & named as Radio Company of America-Socket DIN-Socket developed in German and expanded as Dutch Industrial Norms - Socket

Q.18. What is USB-Port & USB cable?

Ans. 18) USB (Universal Serial Bus) is a Communication Port found in Computers & Computer peripherals. In this Serial Data is communicated through USB Port from a Computer to the Digital Gadget through an USB-Cable.

Different Versions of USB is found in practical application as per Bandwidth & Data Transfer rate such as USB-1.0, 1.1 & 2.0 etc.



Fig 6.5.4: USB Cable

Q.19. What is D-sub Connector?

Ans. 19)



Fig 6.5.5: D-SUB Connector

They are available in different configurations as 9-Pin, 15-Pin, 25-Pin etc.

Q.20. How a 15 pin D- Sub connector is used?

Ans. 20) 15-Pin D-SUB is used for Monitor connection (In / Out) in the following applications. This carries Analog Video Signal.

a) PC & Monitors d) LCD Projection TV

e) PDP – PC Input

c) LCD Projectors

b) LCD TV

f) Digital Set Top Box

Q.21. What are 9-Pin,15-Pin & 25 Pin D-sub port

Ans. 21) 9-Pin D-Sub: For Serial Data Communication (Digital

Camera, MP-3 Players, Digital Databank etc.)

15-Pin D-Sub: RGB In/Out for output to Lap top, PC Monitors.

25-Pin D-Sub: Parallel Data for Communication (Printer, Scanner etc)

Q.22. Is there any difference in resolution of Composite, Component & S-Video signals ?

Ans. 22) Resolution of these signals is as given in table:

Types of Video	Composite Video	Component Video	S-Video	
Resolution	240 ~ 270 Hor-Lines	500 Hor-Lines	400 Hor-Lines	

Tab 6.5.1.2: Video Resolution

Q.23. What is a TFT LCD?

Ans. 23) Ans. 23) TFT LCD (Thin Film Transistor Liquid Crystal Display) is a type of LCD flat panel display where each pixel is controlled by a transistor and a capacitor placed at the back of the panel plate.

Q.24. What is contrast ratio?

Ans. 24) It is the ratio of brightness in maximum black area to the brightness in brightest area . This ratio is used to define contrast of LCD TV.

Contrast Ratio = Light in Maximum Black Area / Light in Maximum White

Area Example:

If black area brightness =0.5 Candela/m²

& the white area produces brightness=500 Candella/m²

Then CR = 0.5 / 500 = ½*500 =1/1000= 1:1000

Candella is the unit of brightness.

Contrast ratio is used for LCD / LED TVs and is defined in two ways :

- 1) For a dark room: For this test is done in test conditions in a dark room to ensure that light from surroundings does not enter the room.
- 2) For areal living room : It being a real room like in any body's house, it is affected by brightness within the room. Due to this the value of the super contrast is not the actual value. But companies use terms as Dynamic Contrast Ratio etc which is a marketing term and it is not technical..

Q.25 What is MP-3

Ans. 25) It is Motion picture expert group audio layer 3.0 It is a digital format to compress audio files.

Q.26 What is MPEG-1 & MPEG-2?

Ans. 26) MEPG-1 : It is Motion Picture Expert Group 1 format and covers Large video-files MPEG-2 : It is Motion Picture Expert Group II. It also has video files.

Q.27. What are advantages of a LCD TV?

- Ans. 27) 1. Aesthetic Slim Design, can be wall mounted.
 - 2. Low power consumption as compared to CRTTV or Plasma TV.
 - 3. Better resolution.
 - 4. No UV-radiation, No X-Ray & no irritation to human eye.
 - 5. No colour patch problem as no electrons are used.

Q.28. Whcih is better CRT or LCD TV?

Ans. 27) CRT had its own advantages. Since it has phosphors, it has its own light and it does not need a back light. So, its contrast is excellent. Contrast means difference between black and white. In CRT TV, you get black when you keep contrast and brightness zero. But in LCD TV, you may not get perfect black because some back light can pass through the crystals even when brightness is kept zero. In CRT TV, there are no issues of a response time as in a LCD TV. However, because of electrons movement in CRT TV, we get issues of colour patches and convergence. Also, because of some curvature in the CPT, any vertical or horizontal line will not appear straight in a CRT TV. The CRT TV is also very bulky, heavy and its aesthetics are poor. Its power consumption is also high. It can not be hanged on a wall. Its connectivity is also not as good as that of FPD.Colour reproduction is excellent in a FPD.

Thus, it is cleat that every technology has its advantages and disadvantages. Inspite of its short-coming in contrast, LCD is definitely much better that a CRT TV.

Exercise:

- 1. Name the cards used in a LCD TV.
- 2. What are the main voltages in a LCD TV?
- 3. What is CCFL?
- 4. Which colours are used to produce all colours in a LCD TV?
- 5. How will you connect a Laptop having HDMI output to a LCD TV.
- 6. You have a pendrive and have saved a movie in it. Can you play it on a LCD TV/ How?
- 7. Can you use a detergent or Colin Spray to clean panel of a LCD TV?
- 8. What is the best height for mounting LCD on a wall?
- 9. A customer has a wooden partition in his room and asks you to mount the LCD TV on it? What will you do?

- Notes
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7. Engage with customer

Unit 7.1 – Company Policies on customer handling Unit 7.2 – Call customer prior to visit Unit 7.3 – Interaction at his premises



- Key Learning Outcomes

At the end of this module, you will be able to:

- 1. Apply best practices for customer service skills
- 2. Handle different types of customer
- 3. Apply art of telephonic etiquette to call customer
- 4. Apply procedure for visiting customer
- 5. Achieve productivity quality

UNIT 7.1: Company Policies on customer handling

- Unit Objectives 🧖

At the end of this unit you will be able to:

- 1. Apply best practices for customer service skills
- 2. Handle different types of customer

Do

- Do "Role Play " sessions, with one of the participants becoming customer and another TV Technician
- Discuss the TGR : Things gone right
- Discuss TGW : Things gone wrong

Ask

- Ask the participants to recapitulate learnings from earlier sessions
- Ask what is required for delighting and winning over the customer
- Ask how to handle difficult customers

Demonstrate

- Demonstrate customer handling during practicals
- Demonstrate common etiquettes during practicals
- Demonstrate Tele conversation skills during practicals

- Customer is king
- Customer is the very purpose of our business
- Enhance communication skills

The Customer Service Skills

In this TV industry, customer service skills are considered very important these days. For all those who want to join the service industry, it is very important to have soft and communication skills. We will now see what are some of the specific skills that every support employee can master to delight the customers:

1. Have a smart presentation. Avoid giving a bad picture of yourself and your company. Avoid the things shown in the following picture:



Fig 7.1.1: Proper Appearance

2. Be energetic and keep a smiling face. Avoid showing tiredness and laziness. Do not keep expressions as shown in picture:



3. Patience

This is extremely important for service personnel. Not only is patience important to customers, who often reach out to support when they are confused and frustrated, but it's also important for the business. But if you have patience, it does not give you an excuse for bad service.

Service is an interaction where the time spent with the customer is used to better understand his issues and needs from the company.

As you deal with customers on a daily basis, be sure to stay patient when they are angry and frustrated, but also be sure to understand that they prefer to get competent service .

4. Attentiveness

The ability to really listen to customers is very crucial for providing great service for a number of reasons.

Not only is it important to pay attention to individual customer interactions (watching the language/terms that they use to describe their problems), but it's also important to be mindful and attentive to the feedback that you receive at large.

Understand their non verbal communication by their body language.



Fig 7.1.3: Facial Expression to Avoid

5. Communication Skills

A Field engineer should be a good listener. Listen to customer and talk only when required. There should not be any loose talk. To start a conversation, you can start with a discussion about weather but it should be very short and after that you must discuss about the issue being faced by the customer. Do not brag about your technical skill or knowledge. Customer is not interested in that. Listen to him, understand the issue. Understand the issue immediately so that customer's time is also not wasted When it comes to important points that you need to convey clearly to customers, keep it simple and leave nothing to doubt.

- 1. Product Knowledge
- 2. You should always keep yourself updated on models, features, specifications, technical details, com pany policies and a deep knowledge of how the product works.

Once you have all these details, you are in a position to provide service to the customer's satisfaction.

6. Talk positively

aspect.

Using positive Language is a very important part of persuasion, and customers create perceptions about you and your company based on the language that you use.

Here's an example: Let's say a customer wants to purchase an accessory but that is out of stock. Example of talking without positive language: "I can't get you that accessory until next month. It is unavailable at this time. It is not my fault.

• With positive language: "That will be available next month. I can place the order for you right now and make sure that it is sent to you as soon as it reaches our warehouse."

In the first example it may not be negative , but the tone and the way the communication is conveyed can make the customer feel bad and he may also be offended or annoyed. In the next example also the same message is conveyed but the engineer is also giving a solution by saying that he can place the order immediately. So, the engineer is not focusing on the negative

The user/individual on the job needs to know and understand :

SB1. how to approach a defect

- SB2. make use of standard OEM specified troubleshooting steps
- SB3. interpret intermediate results and progress fault rectification accordingly

SB4. utilize appropriate tools to rectify faults. Body language: Use a positive body language. You should be energetic and you should smile keeping in view of the time and surroundings.

7. People management Skills

Sometimes you may get customers who are not satisfied and happy. Situations outside of your control like a traffic jam will sometimes delay your visits and an irritated customer may become more annoyed but you have to handle such situations with patience and calm. In such a case, you may call him and inform him a tentative time when you can reach his house.

8. Time Management

You should try to understand what customer wants, check the product, find fault, inform customer and repair in time . If you find you there are some issues which you can not solve, escalate those to your supervisor.

9. Ability to "Read" Customers while talking on phone

You have to understand some basic principles of behavioral psychology and should be able to "read" the customer's current emotional state.

This is an important part of the personalization process as well, because it takes knowing your custom-ers to create a personal experience for them.

More importantly though, this skill is essential because you don't want to misread a customer and end up losing him due to confusion and miscommunication.

Look and listen for subtle clues about his current mood, patience level, personality, etc., and you may be able to get an idea about how to interact with him.

10. A Calming Presence

It is a great quality and it is very difficult to practice but such a presence will help you in keeping cool under stress and also handling irritated customers tactfully.

Many customers keep this quality of a service engineer at top and rate the company accordingly. It means that they give repeat orders and they also recommend that company to others. If this happens you are going get appreciation and will get chances of going up in your in your career. A good service engineer ensures that his customer does not get annoyed. Instead he tries to please the customer with his service

11. Goal Oriented Focus

It is also an important customer service skill. Your company gives you daily, weekly and monthly targets and goals for the number of calls that you have to complete and the revenue to be generated through sale of accessories. Ensure that you achieve your goals. It should be clear to you that when you provide a service which makes the customer delighted, he does not mind spending on purchase of accessories or AMC. If all technicians work to achieve their targets, the amount can be substantial and useful for the company. This can be done along with providing a delightful service. Companies also pay incentives to engineers who bring revenue through sale of accessories or AMC.

12. Ability to Handle Surprises

Sometimes the problem you encounter isn't covered in the company's guidelines, or maybe the customer is reacting differently than what you had thought.

Whatever the case, it's best to be able to be a quick thinker. You should have guidelines for yourself in such situations.

We will here try to come up with a quick system for a situation when you meet a customer who has a product problem which you've never seen before...

- Who? You should know whom to consult if you need help.
- What? When you are faced with a problem you have also to know how and what to convey
- How? When it comes time to inform and involve someone else, how are you going to contact him?

13. Persuasion Skills

In customer support often customer wants to understand how the product operates. He may not be dissatisfied. So, it is important to give him a detailed demonstration so that he understands it and with your persuasion and demonstration, he is convinced that your product is right for him (if it truly is).

14. Do the extra effort

A good work philosophy and willingness to do what needs to be done (and not take shortcuts) is important for providing excellent service.

You can provide excellent service by ensuring that you provide service such that the customer is delighted and you make every customer feel special by the way you speak to him, handle his product and carry out your work in his premises. Doing so does not mean that you should not follow your Com-pany's guidelines and rules. You can follow the rules and still support and help the customer. Remember that your customers are also human beings and if you put in a little extra effort, the custom-er will be delighted and recommend you to your supervisor and your company to his friends and relatives

15. Closing Ability

It is not like "closing sales".

It means you are able to end the visit with confirmed satisfaction (or as close to it as you can achieve) and with the customer feeling that everything has been taken care of (or will be).

Your leaving the customer's house before all of his related problems have been addressed / sorted out is very important and makes customer happy.

Your willingness to do this shows the customer 3 very important things:

- That you care about getting it right
- That you're willing to keep going until you get it right
- That the customer is the one who determines what "right" is.

16. Willingness to Learn

If you wish to learn new skills and want to update your knowledge, you can go up in life and career. Those who are not ready to learn may be left behind in their career.

UNIT 7.2: Call customer prior to visit

- Unit Objectives 🤎

At the end of this unit you will be able to:

- 1. Apply art of telephonic etiquette to call customer
- 2. Explain the process of lodging complain
- Do
- Do "Role Play" session with one of the participants playing the role of TV technician seeking appointm-ent of the customer over the telephone, while another answering the call
- Discuss : TGR : Things gone right
- Discuss TGW : Things gone wrong

Ask

- Ask the participants to recapitulate learnings from earlier sessions
- Ask why a TV technician has to visit a customer
- Ask how to take appointment of the customer

Demonstrate

- Demonstrate telephone communication skills during practicals
- Demonstrate taking customer appointment for visit during practicals
- Demonstrate how to handle difficult customers during practicals

- Customer centricity has to be built into the organisation
- Customer satisfaction is key to business growth
- Handling difficult customers is a skill

Communication with customers:

This is a consumer oriented industry and customer is the most important person for the Company.

Process of lodging a complaint:

At time of sale, dealer lodges a demonstration call with the call centre. The call center executive allots a job number for this call. The call can also be made by the customer within or out of warranty. This call by a prior algorithm goes to the franchisee of that area. The franchisee downloads all the complaints received up to 11 A.M. of a working day ora time decided by that company. He takes print out of the jobs and allots the calls to his team members as per the areas allotted to them. If any out of area complaint is downloaded, the franchisee informs the company and mails that complaint to the company. Each techni-cian now checks the jobs with him and starts calling the customers.

Method of calling a customer:

The technician dials the customer's number as printed on the job sheet. The customer receives the call and the conversation goes like this:

Technician: Good Morning Sir / Ma'm. I am-----calling from-----Company. Sir, you have purchased a ------product of ------ Company. I have to visit your house to install the product and give its demonstration. Or, Sir, you have lodged a complaint with us for your i/w, o/w product? What is the time convenient to you when I can visit ?

Customer: You can come at ----- A.M. / P.M.

Technician: O.K., Sir, I will be there at this time.

If it is not a demonstration but a call due to a fault in the product, check product model number and warranty / AMC status also on phone. Also ask the customer to describe the fault so that you can plan for the repair and arrange the parts to be taken with you.

Please note that if you can not attend the call as per the appointed time due to any reason, you must call the customer and apologise and request for another time. Ensure that you visit him as per the fresh appointment.

At the customer's premises:

Park your vehicle in parking area of the society if it is a society flat.

Take off your helmet and lock it.

Comb your hair and tuck your shirt inside your trousers.

Take a mouth freshener if you have a foul breath.

Press the bell gently at customer's house and stand 2 feet away from the door and wait patiently for the customer.

When the customer opens the door, introduce yourself and show your ID Card.

When the customer asks you to come inside, put on your shoe covers, if applicable, inform the customer about it and enter his house.

Ask him where is the TV and go to the spot with his permission.

UNIT 7.3: Interaction at his premises

Unit Objectives

At the end of this unit you will be able to:

- 1. Apply procedure for visiting customer
- 2. Apply communication skills required for customer interaction
- 3. Achieve productivity quality



- Discuss standard operating procedure for customer visits by technician
- Do " Role Play " sessions
- Do TGR & TGW analysis

Ask 🥘

- Ask the participants to recapitulate learnings from earlier sessions
- Ask why it is important to get customer's feedback after the technician's visit is over
- Ask how to improve quality of service rendered to customer
- Ask how to improve productivity of the service technician

Demonstrate

- Demonstrate standard operating procedure for customer visits by TV technician during practicals
- Demonstrate skilful customer handling during practicals
- Demonstrate completing visit reports during practicals

- First impression on the customer is a lasting impression
- Technician's customer visits may be for installation, repairs, AMC : Annual Maintenance Contract, Feedback, courtesy
- Technician is representing the whole organisation

Interact with the customer prior to visit:

Visiting the customers:

The supervisor, technicians, stores and accounts should so plan that all technicians should be able to leave the office maximum by 12.00 P.M. Now the technician should leave for the first customer as per his route plan.

Reaching the customer's premises:

He should be there 5 minutes before the appointed time.He should park his vehicle in the parking area. After this he should comb his hair and tidy up his clothes so that he is presentable. He should take a mouth freshner if he has a foul breath. He should also use a good deodorant if he has bad body odour. He should now ring the bell of the customer's house. The bell should be pressed very gently and after pressing the bell, he should stand two feet away from the door. When the customer answers the door bell, he should take out his ID Card and show to customer and then proceed as already stated above. After completing his job as per details given above, he should leave and do as already suggested above. If while working, he is in a problem (any sudden development), can not understand the fault or faces any issue, he should call his supervisor for help / support and proceed as advised. Similarly, if he finds one of his colleagues to be in difficulty, he should be ready to help / support. He should be ready to accept a call near his area if one of his colleagues requires help / support but with his supervisor's consent. If he gets a call from a customer who lives in another area adjacent to his area, he should pass on the complaint to his colleague who works in that area and also inform his supervisor.

At the time of interaction check customer complaint registered at customer care or installation / visit schedule. After that call the customer to confirm problem and fix time for visit. When the customer takes the call, greet the customer and confirm the Address, Model number and time of visit as per customer's convenience, problem registered. Be polite and patient when interacting with customer. During Interac-tion very carefully check about warranty status of appliance and annual maintenance contract. Also ask about the symptom / problems so that you can carry tools and parts accordingly.

Interact with customer at their premises:

At the customer's premises you must enquire about the symptoms and history of problems in the product. Also, ask about the age of appliance and status of upkeep and identify the problem based on custom-er's information and your observation. Check / Take snap of warranty card, bill, AMC (as per your Compa-ny's policy). After identifying the problem inform about costs estimate (only if set is out of warranty or not covered under warranty policy of the Company) to the customer.

Suggest possible solutions to customer:

After discussing the problem with the customer and identifying it, you have to suggest possible solutions and costs involved and explain the approximate time required and methodology for rectifying necessary problem. After this, you have to take customer's approval for further action.

Achieve productivity and quality:

You have to accurately assess the problem and solution(s) necessary for particular problem and offer most appropriate and cost-effective service as per customer's requirement. Ensure customer satisfaction and positive feedback and record minimum customer complaints post service. To avoid repeat problem post service, prepare most optimum route plan to complete daily target visits. While attending jobs, you must follow "FTR i.e. first time right "FTR is a Japanese term. The idea is that what ever is required to be done should be done in the first time itself. Doing this may initially take more time but it will ensure customer satisfaction and lesser future complaints resulting into cost effective solutions and target achievement also.

The user/ individual on the job needs to know and understand the company's policies on customer care, company's code of conduct, organization culture and typical customer profile company's reporting struc-ture and company's documentation policy.

During interaction user/ individual on the job needs to know and understand company's products and recurring problems reported in consumer appliances and how to communicate with customers in order to put them at ease on the basic electrical and mechanical modules of various appliances, electronics involved in the type of appliance models of different appliances and their common and distinguishing features and functionality of different features of appliances and new features. Proper etiquette must be followed at customer's premises and precautions must be taken while handling field calls and dealing with customers. Carry relevant reference sheets, manuals and documents to in the field.

Exercise:

- 1. When you visit a customer's house and if you find that the set is out of warranty, what will you do?
- 2. You find that the customer is very annoyed with your Company, how will you react?
- 3. You are not able to reach customer's house in time and will be late by about 1 hour. What should you do?

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Transforming the skill landscape



8. Interact with Colleagues and Supervisor

Unit 8.1 – Interact with supervisor Unit 8.2 – Interact with colleagues Unit 8.3 – Report Making Unit 8.4 – Submitting the call report



- Key Learning Outcomes

At the end of this module, you will be able to:

- 1. Interact and communicate effectively with supervisor
- 2. Interact & communicate effectively with colleagues including member in the own group as well as other groups
- 3. Report the incident effectively
- 4. Explain role and responsibility of employee and supervisor
- 5. Apply best practices and skills required for Team work and multi-tasking
- 6. Prepare job card having information of customer, mobile phone brand & model and repair requirement
- 7. Prepare call report

UNIT 8.1: Interact with Supervisor

- Unit Objectives 🧖

At the end of this unit you will be able to:

- 1. Interact and communicate effectively with supervisor
- 2. Report the incident effectively
- 3. Explain role and responsibility of supervisor



- Do "Role Play" session with one of the participants playing the role of TV technician seeking appointm-ent of the customer over the telephone, while another answering the call
- Discuss : TGR : Things gone right
- Discuss TGW : Things gone wrong

Ask 🦳

- Ask the participants to recapitulate learnings from earlier sessions
- Ask why a TV technician has to visit a customer
- Ask how to take appointment of the customer

Demonstrate

- Demonstrate telephone communication skills during practicals
- Demonstrate taking customer appointment for visit during practicals
- Demonstrate how to handle difficult customers during practicals

- Customer centricity has to be built into the organisation
- Customer satisfaction is key to business growth
- Handling difficult customers is a skill

Overview:

This module covers the soft skill of the participants. You will learn how to co-ordinate with supervisor, how to co-ordinate with colleagues. You will also learn about safety procedure and safety measures in an organization, the reporting structure there and about communicational skills and personality development.

Communicating With Supervisor: Learning Outcome:

- Incident Reporting Structure
- Employee Responsibility

Incident Reporting Procedure:

A procedure for reporting incident is essential, so that all near misses/ accidents/ dangerous occurrences/ occupational disease do not go unnoticed, and that preventive measures can be taken to prevent similar reoccurrences.

Types of Incident Reporting:

A procedure for reporting incident is essential, so that all near misses/ accidents/ dangerous occurrenc-es/ occupational disease do not go unnoticed, and that preventive measure can be taken to prevent similar reoccurrences.

- Dangerous Occurrence: Imminent risk of the death, or serious injury to anyone, an occurrence that endangers or is likely to endanger the safety of people at a workplace
- First Aid: The provision of initial care for an illness or injury. It is usually performed by non-expert, but trained personnel to a sick or injured person until proper medical treatment can be accessed.
- Hazard : A source or a situation with a potential for harm in terms of human injury or ill-health, damage to property, damage to the environment, or a combination of these.
- Hazard Identification: The process of recognizing that a hazard exists and defining its characteristics.
- Illness: Any physical or mental ailment, disorder, defect or morbid condition, which can be of sudden or gradual development. This also includes the aggravation, acceleration, exacerbation or reoccur-rence of any pre-existing disease.

- Incident: Any unplanned event resulting in, or having a potential for injury, ill health, damage or other loss.
- Injury: Any physical or mental damage to the body caused by exposure to a hazard.
- Lost Time Injury: A work related injury which results in a person being absent from work for at least one full shift.
- Medical Treatment Injury: A work related injury which results in treatment provided by a qualified health professional.
- Near Miss: An incident that does not produce an injury or disease but has the potential to do so.
- Risk: The likelihood and consequence of an injury or harm occurring.
- Risk Assessment: The process of estimating the magnitude of risk for an activity and identifying the actions taken to eliminate or minimize the risk.
- System Failure: Systematic processes that fail to manage the task, activity, process or problem.

Procedure:

- An employee who encounters a near miss or an accident should immediately report the incident to his superior.
- If the employee is injured, the superior concerned should ensure that the injured is given first aid and sent to clinic/ hospital for treatment, if necessary.
- In the event of an amputation, bleeding should be controlled at once. Call for an ambulance immediately at Tel: 102. The superior should then inform Human Resources Department immediately.
- The superior should immediately conduct an investigation into the accident by interviewing injured and/ or witness (es). Operation on machine involved may need to be suspended/ stopped if situation warrants.
- The department concerned has to implement the preventive measures accordingly.
- The accident statistics chart shall be updated accordingly after the occurrence of a lost time accident.

Employee Responsibility:

- Reporting hazards, incidents, injuries, dangerous occurrences and systems failures which occur or have the potential to occur.
- In the event of an injury or unsafe situation, do what they can to ensure the safety of others.

Supervisor Responsibility:

- Ensuring that injured employees or visitors found in the company are referred to, appropriate first aid &/or medical assessment for any reported injury/illness;
- Immediate referral to the ESI / Nearest Hospital of any injured employee or visitors in the company who requires medical assessment or treatment;
- Hazards, incidents, injuries, dangerous occurrences and systems failures are appropriately reported for areas under their supervision;
- Corrective actions are developed in consultation with employees and are implemented to eliminate the risk of injury, or where this is not possible, reduce the risk to an acceptable level;
- Follow up on the effectiveness of implemented corrective actions in consultation with employees.
- Definitions:
- PPE: Personal Protective Equipment E.G. Hand Gloves, Goggles, ESD safe shirt, apron, shoes.
- HSE: Health and Safety Environment
- OSH: Organisational Safety and Health

Exercise:

- 1. What do you understand by PPE?
- 2. Is it necessary to use PPE while working ? If so, why?
- 3. What do you understand by OSH?

UNIT 8.2: Interact with colleagues

Unit Objectives 🤎



- 1. Interact & communicate effectively with colleagues including member in the own group as well as other groups
- 2. Apply best practices and skills required for Team work and multi-tasking



- Do team building exercises
- Encourage the participants to learn multiple skills to perform multiple tasks
- Do Bench Marking, try to catch up with best

- Ask 🤄

- Ask the participants to recapitulate learnings from earlier sessions
- Ask why you need to interact with colleagues
- Ask why team work is important
- Ask why muti-tasking is important
- Say
 - Individuals do not work in isolations
 - They all need to work cohesively in effective teams in order to be successful
 - Individual efforts need to be focussed on oriented towards the team objectives

Demonstrate

- Demonstrate team work during practicals
- Demonstrate best practices during practicals

- Teams exhibiting excellent team spirit always win in the long run
- Leaderships qualities need to be inculcated

Team Work & Multi-Tasking:

Learning Outcome:

- How to work in a team
- How to handle different types of work at a time also called Multi Tasking.

1. Be Liberal with Praise:

People like others to recognize them for a job well done. Pay attention to what other people are doing and congratulate them on hard work and successes. Simple politeness goes a long way too. People appreciate smiling, saying please and thank you, and even saying hello and goodbye. These things are particularly important if you have people you manage. Employees expect politeness and praise from their boss or superior, and they'll like you a lot better for it.

2. Pick Your Moments:

When you work in a shared office space, it's important to recognize when people are available to talk.Do not interrupt while other is working and do not stop some one mid way when he is rushing to complete a job. So even if you have something to share, be aware of what others are doing, and not interfere or disturb others. Alao, choose your words carefully.

3. Take an Interest Outside of Work:

While thinking of moving with colleagues outside of work, first you should take an interest in their person-al life at work. Ask about their families and hobbies, and discuss your weekends or evenings when you arrive in the morning. Pay attention to their moods while they're working and sympathize with them, whether they're happy or sad. Make sure you balance what you ask them to reveal and what you're willing to talk to them about.

4. Be Willing to Socialize on Your Breaks:

When its lunchtime, or time to go home, don't rush off immediately. Doing so will make it look like you can't wait to get out of there and away from everyone else. Although sometimes it's perfectly acceptable to want time to yourself, make sure you don't go off on your own all the time. Especially if other people spend their breaks together, you'll look like the antisocial one if you don't want to join in.

5. Treat Your Co-workers as You Would Want Them to Treat You:

When you leave school, you hope that you have left bullying behind. But often that's not the case, and many people find themselves feeling victimized at work. It may seem like a no-brainer, but treating your colleagues as you want them to treat you will get you far. Even if you don't like them and they don't like you, take the higher ground and be polite for the sake of your working relationship.

6. Don't Gossip:

One thing you probably don't want people to do is talk about you behind your back. It may be difficult not to join in, especially when you're dying to agree with someone about a colleague's behavior. But there is always a risk that gossip will get back to the person it's about. If you do have a problem with someone, you can choose to keep silent or to confront them. Which one is most appropriate will depend on the situation, but if all you want to do is vent then wait until you get home. It's better that whoever you live with gets fed up with your work complaints than you create a bad atmosphere in the office.

7. Face Problems Head On:

Sometimes when there's just no chance of getting along with a colleague, you need to do something about it. In particular, if a colleague is doing something that makes you feel uncomfortable or upset, you should follow the company procedure for reporting it. It can be difficult to work up the courage to do this, and you should weigh up the possibilities of where it might lead. It could end in the problem getting resolved, or it could escalate and get worse. In the best case, your company has a supportive system that resolves these issues appropriately. You can also attempt to deal with problems informally, by approaching your colleague face-to-face. This may help to resolve the issue, but you should remain calm and prepare your-self for them to be unresponsive.

8. Don't Push Too Hard to Make Friends :

Never put making friends over being a professional. Remember that you are there to do your job first of all. By being nice at work and during breaks, you can increase your chances of socializing with your colleagues outside of work. But people don't need to see everything of who you are while you're working. The worst case scenario, when you're polite and professional, is that you haven't made best friends. If you get on with your work you're unlikely to clash with anyone or make any enemies.

9. Offer Help When It is needed:

Make yourself stand out as the friendly and helpful one by offering help when others need it. Donot be so enthusiastic also, but be ready to help when someone asks. Even when no one is asking, you might want to volunteer to help someone occasionally if you have the time. But you should not do it at the cost of your work unless it is an emergency.

UNIT 8.3: Report Making

Unit Objectives



At the end of this unit you will be able to:

- 1. Prepare job card having information of customer, mobile phone brand & model and repair requirement
- 2. Prepare document for the action taken based on job card
- Prepare customer profile data base for future marketing requirements
- Do defect analysis, Root Cause Analysis
- Put in place recurrence prevention actions for defect elimination
- Do trend analysis on the customer complaints



Do

- Ask the participants to recapitulate learnings from earlier sessions
- Ask why is it necessary document all information based on the job cards

Demonstrate

- Demonstrate defect analysis during practicals
- Demonstrate corrective & preventive actions during practicals

- Job cards should be properly filled in
- Job cards offer wealth of data for continual improvements

Job Sheet / Card:

A sample of a job sheet is shown below. Different Companies may use different job sheets. But main data required is shown here. It includes Customer's name, address, contact number, product, model name / number, name of dealer, fault, time of entry at customer's house and time of leaving, action taken / parts replaced, payment collected etc. This information is useful for quality reports also

ABC Company

Job Sheet / Card Branch Name Customer's Name and Address Land Mark Land line / Mobile Number / Alternate Number Product: CRT TV/LCD TV /LED TV Model Number Purchased from Date of Purchase

Engineer's Report

Time In	Time out	Fault observed	Diagnosis	Part to be replaced	Number of old part if it is a Class A part	Action taken

Tab 8.3.1: Engineer's Report Customer's Signatures and remarks

Engineer's Signatures

Daily Report:

A format of Daily Report is shown here. After day's work is completed, the technician should complete this daily report. After reporting in the service Centre in the morning, the technician has to submit this report along with the job sheets to his supervisor. The supervisor approves the report and the local conveyance of the technician as also the replacement of spares , if any. The OK reports are filed and pending jobs are re allotted. In some Companies, a copy of this jobsheet is used by the technician to claim his local conveyance.
ABC Company

Daily Report Name of technician Date

S.N.	Job Number	From	То	Km	Rate per Km.	Amount
1.	J1	Office	Job J1			
	J2	Job J1	Job J2			
	J3					
	J4					
	J5					
	J6	J6	Residence			

Tab 8.3.2: Sample Daily Report

Signed by

Approved by

Technician

Supervisor

House Lock Card:

Dear Sir / Ma'm,

l, en	gineer from ABC Company visited you on date and time in response to Job
Number	and as per my tele discussion with you. I found your house locked. Please call me at
number	so that I can reschedule a visit to your house you again to fix the issue.

Thanks,

Engineer

Warranty Card:

Dear Sir / Ma'm,

Every Company issues a warranty card when a product is sold. This card states the terms and conditions of the card. Some Companies want their customers to fill a copy of the warranty card and send it to the Com-pany for their records. A sample of a warranty card is shown below so that the reader can understand about this card.

ABC Company

This warranty is given for ----- years to the original purchaser of the product and is subject to the following terms and conditions:

- 1. It is not transferrable.
- 2. When your product is defective, call only our authorized engineer.
- 3. The set should be used as per the guidelines and specifications given by us.

The warranty may become invalid if:

The product is shown to and got repaired by an unauthorized person.
 There may be more conditions and these may vary from Company to Company. We have only shown you how does a warranty card look

UNIT 8.4: Submitting the Call Report



At the end of this unit you will be able to:

- 1. Prepare call report for office submission
- 2. Prepare cash receipt
- 3. Prepare quality report



- Familiarise the participants with monetary transactions
- Help them maintain accounts



- Ask the participants to recapitulate learnings from earlier sessions
- Ask why report submission is important
- Ask how to handle monetary transactions, cash, debit / credit cards, paytm



- Demonstrate monetary transactions during practicals
- Demonstrate recording keeping requirements during practicals



- Analyse call reports for quality improvements
- Analyse call reports for productivity improvements

Reporting in Office:

The technician is required to report in the office every morning as per the policy. He is informed if there is any deviation in this. Besides, he should be in Company Uniform and should display is ID Card. His uniform should be neat and clean and properly ironed and shoes clean and polished so that he remains present-able. After reaching the office, he should punch his attendance and then he should greet every one he meets. This not only gives others a good feeling about him but also gives him a good feeling. After this, he should report to his supervisor and as per his instruction, submit his report of previous day. After giving this report, he is allotted fresh jobs+pending jobs of previous day. He is now expected to call all fresh jobs' customers and fix appointment and also understand the fault in the product. Based on this, he will prepare an indent of the spares to be collected from stores. At the same time, he will return the defective spares to the stores and if required, claim their replacement. However, this replacement and spares indent has to be authorized by his supervisor. He should also deposit cash collected, if any, from any customer, with the accounts department and collect a copy of the receipt for his own records and ask the accounts department to send the receipt to the customer by post as per company policy. For deposit-ing the cash with accounts, he has to deposit the cash along with temporary cash receipt already issued by him to the customer. A sample of a temporary cash receipt is shown below

Temporary Cash Receipt:

This is issued by the technician when he charges some amount from a customer as per Company policy. He collects the payment from the customer and next day deposits this amount in the Company office. After this, the Company accounts department sends a proper receipt to the customer. A sample of this receipt is shown below:

Temporary Cash Receipt

ABC Company	TCR Number;
Branch:	Date;
Job Number	
Warranty Status: I/W, O/W/Tempered/Broken	
Received a sum of Rs from Mr./ Ms. On account of A proper	receipt will be sent
to you by mail.	
Signed by	

After this, he should make his route plan with his supervisor's consent. The following need to be considered for this:

- 1. He should plan to make a shorter route plan to save travel time and fuel expenses.
- 2. Yet, he has also to ensure that he must visit the jobs as per the appointment time given by respective customers.
- 3. If the time slot given by customer does not match the route plan, he should consult his supervisor so that the route plan can be re drawn.

Quality Report:

This report is generated from the job sheet filled by the field technician. This report is very important for the Company because from this only the Company gets the data about the performance of its products in the field and can take corrective action. A sample of the report is shown below:

ABC Company
Quality Report for CTV / LEC/LED etc
Date
Branch
Customer 's Name & Address
Dealer's Name
Job Number

Month

Model Number	Issue faced	Snap of t he faulty part / module	Voltages	Checked ^{and} reported by	Type of Signal

Tab 8.4: Quality Report

Signed by

Exercise:

- 4. If you visit a customer and his LCD TV is in warranty but he has shown it to an outside technician who has done wrong connections due to which the main card has been damaged, what will you do?
- 5. When you visit a customer you find that the model number and set serial number are different than those printed on the job sheet given to you. What will you do?
- 6. What you should do with the cash collected from customers?
- 7. What is to be done with the faulty spares replaced in field?
- 8. Why is it necessary to get customer's signatures on the job sheet?

Notes
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Transforming the skill landscape



9. Employability and Entrepreneurship Skills

Unit 9.1 – Personal Strengths & Value Systems

Unit 9.2 – Digital Literacy: A Recap

Unit 9.3 – Money Matters

Unit 9.4 – Preparing for Employment & Self Employment

Unit 9.5 – Understanding Entrepreneurship Unit 9.6 –

Preparing to be an Entrepreneur



Intr

oyability and Entrepreneurship Skills

This Facilitator's guide includes various **activities** which will help you as a facilitator to make the sessions participative and interactive.

Ice breaker

• You can begin the module with the following ice breaker:

Five of Anything Ice Breaker Steps:

- Divide the participants into groups of four or five by having them number off. (You do this because people generally begin a mee^{ting} by sit^{ting} with the people they already know best.)
- Tell the newly formed groups that their assignment is to share their five favourite movies of all time, their five favorite novels or their five least liked films. The topic can be five of anything - most liked or disliked.
- This ice breaker helps the group explore shared interests more broadly and sparks lots of discussion about why each person likes or dislikes their selected five.
- Tell the groups that one person must take notes and be ready to share the highlights of their group discussion with the class upon completion of the assignment.

Expectation Mapping

During the first session and after ice breaker session, ask the **participa**nts to answer the following ques**tion:** "What do I expect to learn from this training?"

- 1. Have one of the participants write their contributions on a flip chart sheet.
- 2. Write down your own list of covered material in the training on another flip chart sheet.
- 3. Compare the two sheets, commenting on what will and what will not be covered during the training.
- 4. Set some ground rules for the training sessions. Ask the **participa**nts to put these rules on a flipchart and display it in the class.
- 5. You may get back to those sheets once again at the end of the last session of the training.
- 6. Benefits of doing this activity:
 - Participants feel better as their opinions are heard.
 - Participants get to know what they should expect from the training.
 - The facilitator gets to know which points to emphasize, which to leave out, and which to add during the training.
- 7. Expectations from the participants:
 - Must sign the attendance sheet when they arrive for class.
 - Conduct themselves in a positive manner
 - Be punctual, attentive, and participative
- 8. Explain the contents that are going to get covered one by one and connect it with the expectation mapping done earlier.
- 9. By the end of this exercise, the participants should have a clear understanding of what to

expect from the session and what are the areas that will not get covered.

Defining Objectives

- 1. Defining the o^{bjecti}ves in the beginning of the units sets the mood for the unit.
- 2. To begin with the end in mind sets the expectations of the participants as what could be the important takeaways from the session.
- 3. It is also a way of making participants take responsibility of their own learning process.
- 4. For the facilitator, the objectives decide a designed path to progress on so that the learning stays aligned and on track.
- 5. Read the objectives slowly, one by one, and ask the participants to explain what they think it means.
- 6. At the end of the session, you could again revisit the **object** ves to find out from the **participa**nts about how many object ves have been achieved.

In order to effectively facilitate this workshop:

- 1. You must have thorough knowledge of the material in the Participant Handbook, and be prepared to answer questions about it.
- 2. You may also wish to read other material to enhance your knowledge of the subject.
- 3. There may be issues raised with which you are not able to deal, either because of lack of time or knowledge.

You can either state that you will obtain answers and get back to the **participa**nts with the information. In case the query can be turned to an assignment to the class, do so. You can work with the **participa**nts on the assignment.

- 4. You must have a very clear understanding of what the **participa** nts want to accomplish by the end of the workshop and the means to guide the **participa** nts.
- 5. As the facilitator, it is your responsibility to make sure that all logistical arrangements are made for the workshop. This may involve doing it yourself or confirming that someone else has made all necessary arrangements associated with the workshop. Assume nothing and check everything before the workshop begins.
- 6. To break the monotony and boredom during sessions, introduce mini breaks in the form of stretching exercises, jokes, some group songs or games.
- 7. Invite discussion from the participants.
- 8. Probe the participants further and lead them to come to affirmative conclusions.
- 9. Let the participants answer. No answer is incorrect.
- 10. Ask one participant to write all the points on the whiteboard.
- 11. Build the sessions from the answers provided by the class.
- 12. Prepare for the sessions in advance so that the resources like flipcharts, handouts, blank sheets of paper, marker pens, etc. can be kept ready.

13. Ensure that resources like board, markers, duster etc. is available before your session starts. **General instructions for role playing**:

1. You are not being asked to be an actor or to entertain. The purpose of the role play is to

provide a situation in which you can practice certain skills.

- 2. When you read the brief, try to imagine yourself in the situation described and behave in a way you feel to be natural but be conscious of the fact that your role may require a different approach from that which you might normally use.
- 3. You (and others) may benefit from the change in approach and behavior. Therefore, try to use the approach you feel to be most appropriate for the circumstances described in your brief.
- 4. The brief is just the starting point. It simply sets the scene and the tone of session or activity. Try not to keep referring to the brief as this will affect the spontaneity of the meeting. Allow the role play to develop as you think it might in real life and change your reactions in line with the behavior and responses of others involved.
- 5. If you find that you have too little information to answer questions or to describe what has happened in the situation, do feel free to add your own thoughts and ideas. Try to keep these within the framework of the role you are taking and try to make your improvisa tions as realisticas possible.

UNIT 9.1: Personal Strengths & Value Systems

Key Learning Outcomes

At the end of this unit, participants 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 Swachh 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

UNIT 9.1.1: Health, Habits, Hygiene: What is Health?

Unit Objectives 🔘

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

- Explain the meaning of health
- List common health issues
- Discuss tips to prevent common health issues
- Explain the meaning of hygiene
- Discuss the purpose of Swachh Bharat Abhiyan
- Explain the meaning of habit

Resources to be Used

Participant Handbook

Ask 🥯

- What do you understand by the term "Health?"
- According to you, who is a healthy person?

Say 🔤

Discuss the meaning of health and a healthy person as given in the Participant Handbook.

Ask 🖳

When did you visit the doctor last? Was it for you or for a family member?

Say

- Discuss the common health issues like common cold, allergies etc. Refer to the Participa nt Handbook.
- Let us do a smallactivity. I will need some volunteers.

Role Play

- Conduct a small skit with volunteers from the class. Consider one of the villagers has been appointed as a health representative of the village, what measures will you as a health representative suggest to the common villagers to prevent common health issues discussed.
- You will need at least 4 volunteers (Narrator, Health Representative, Head of the Village,

Doctor).

- Explain the health concerns of the village to the Narrator. The Narrator will brief the class about the skit.
- Give the group of volunteers, 5 minutes to do discuss.
- At the end of 5 minutes, ask the group to present the skit to the class assuming them as the villagers.
- The class can ask questions to the group as a common villager.

Summarize

• Through this activity we got some tips on how can we prevent these common health issues.

Say 痛

• Let us now see how many of these health standards we follow in our daily life.

Activity

Health Standard Checklist from the Participant Handbook.

Ask 🥯

How many of you think that you are healthy? How many of you follow healthy habits?

Say

- Let's do an exercise to find out how healthy you are.
- Open your Participant Handbook section 'Health, Habits, Hygiene: What is Health?', and read through the health standards given.
- Tick the points which you think are true for you.
- Try to be as honest as possible as this test is for your own learning.

Do 🗸

- Ensure that all the participants have opened the right page in the Participant Handbook.
- Read aloud the points for the participants and explain if required.
- Give them 5 minutes to do the exercise.
- At the end of 5 minutes, ask the participants to check how manyticks have they got.

Summarize

• Tell them that they need to follow all the tips given in this checklist regularly in order to remain healthy and fit.



Discuss:

- Is it necessary to practice personal hygiene every day? Why?
- How does a person feel when they do not practice good personal hygiene? Why?
- Can good personal hygiene help a person feel good about his/her self? How?

Sav 뎗

Discuss the meaning of hygiene as given in the Participant Handbook.

Activity 🖉

Health Standard Checklist: Hygiene

Say 뎗

- Let's do an exercise to find out if we maintain good hygiene habits or not.
- Open the Participant Handbook and read through the Health Standard checklist given.
- Tick the points which you think are true for you.
- Try to be as honest as possible as this test is for your own learning.

Do

- Ensure that all the participants have opened the right page in the Participant Handbook.
- Read aloud the points for the participants and explain if required.
- Give them 5 minutes to do the exercise.
- At the end of 5 minutes, ask the participants to check how many ticks have they got.
- Ask them to calculate their score.
- Tell them what each score indicates by reading aloud what has been mentioned in the Participant Handbook.

Ask 🔤

- How many of you have heard about "Swachh Bharat Abhiyan"?
- Can you tell the class what it is about?

Summarize
 Tell them about Swachh Bharat Abhiyan as given in the Participant Handbook and request them to take a pledge to keep our country clean.
• What is a habit?
Say
Discuss some good habits which can become a way of life.
Summarize 🔎 ———————————————————————————————————
• Tell them about good and bad habits and the reasons to make good habits a way of life.

UNIT 9.1.2: Safety

Unit Objectives @

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

- Discuss ways to set up a safe work environment
- Discuss critical safety habits to be followed by employees

Resources to be Used

- Participant Handbook
- Safety signs and symbols
- Safety equipments
- Blank papers
- Pens

Say

- There are many common safety hazards present in most workplaces at one time or another. They include unsafe conditions that can cause injury, illness and death.
- Safety Hazards include:
 - Spills on floors or tripping hazards, such as blocked aisles or cords running across the floor. Working from heights, including ladders, scaffolds, roofs, or any raised work area.
 - Unguarded machinery and moving machinery parts; guards removed or moving parts that a worker can accidentally touch.
 - o Electrical hazards like cords, missing ground pins, improper wiring.
 - Machinery-related hazards (lockout/tag out, boiler safety, forklifts, etc.)

eam Activity 🙀

Safety Hazards

- There are two parts to this activity.
- First part will cover the poten tial safety hazards at work place.
- Second part will cover a few safety signs, symbols and equipments at work place.
- Use this format for the first part of the activity.

PART 1			
Hazard	What could happen?	How could it be	
		corrected?	

Ask How could you or your employees get hurt at work? Say Say Let's understand it better with the help of an activity. You will be given a handout within your groups. You have to think about the possible hazards of your workplace, what damage these hazards could cause and about the corrective action.

- Divide the class into five to six groups of four participants each.
- Put the format on the board for the activity.
- Give blank papers and pens to each group.
- The group is expected to think and discuss the potential safety hazards in the workplace.
- Ask the group to discuss and fill the format using the blank sheet.
- Give the groups 5 minutes for the activity.
- For the second part of the activity, show the class some pictures of safety signs, symbols and equipments.
- Now they will put down a few safety symbols, signs or equipment against the safety hazards identified.
- Give them 5 to 10 minutes to discuss and draw/note it.
- At the end of 10 minutes the groups will present their answers to the class.

Say 🔽

- Now, let's discuss the answers with the class.
- All the groups will briefly present their answers.

Do

- Ask the audience to applaud for the group presentation.
- Ask de-brief questions to cull out the information from each group.
- Keep a check on time.
- Tell the group to wind up the discussion quickly if they go beyond the giventime limit.

Ask 🦳

De-briefing

- What did you learn from the exercise?
- As an entrepreneur, is it important to ensure the safety of your employees from possible hazards? Why?

Summarize

- Ask the participants what they have learnt so far.
- Ask if they have any questions related to what they have talked about so far.
- Close the discussion by summarizing the tips to design a safe workplace and nonnegotiable employee safety habits.

evement

UNIT 9.1.3: Self-Analysis- At

va at is Self-Analysis?

Unit Objectives Ø

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

- Explain the importance of self- analysis
- Discuss motivation with the help of Maslow's Hierarchy of Needs
- Discuss the meaning of achievement motivation
- List the characteristics of entrepreneurs with achievement motivation
- List the different factors that motivate you
- Discuss the role of attitude in self analysis
- Discuss how to maintain a positive attitude.
- List your strengths and weaknesses

Resources to be Used

- Participant Handbook
- Old newspapers
- Blank papers
- Pencils/ pens

Activity 🏼

This is a paper pencil activity.

What are the three sentences that describe you the best?

What do you need to live happily?

What are your strengths and weaknesses?

Do

- Write the three questions on the board/ flipchart before the session begins.
- Give plain papers and pencils/ pens to each participant.
- Tell participants to write the answer for the three questions on the paper.
- Tell them the purpose of this activity is not to judge anyone but to understand more about self.

Say 🗣

 Discuss the concept of Self- Analysis and motivation with reference to Maslow's nt Hierarchy of Needs as discussed in the ParticipaHandbook.

Team Activity

Tower building

• Each group which will create tower using the old newspapers.

Do 🗸

- Divide the class into groups.
- Give them some old newspapers.
- The task is to create a tower out of the newspapers.
- The group which will create the highest tower standing on its own will be considered the winning group.
- Groups can use as many newspapers as they want to and in any way, they want.

Ask 🖳

- What did the winning group do differently?
- If you were given a chance, how would you have made the tower differently?
- How did you feel while making the tower?
- Did you feel motivated?

Say

 Discuss the concept of achievement motivation and characteristics of entrepreneurs with achievement motivation as discussed in the Participant Handbook.

Asl	<	C

Is your attitude positive or negative?

Say

Let me tell you a story:

It's Little Things that Make a Big Difference.

There was a man taking a morning walk at the beach. He saw that along with the morning tide came hundreds of starfish and when the tide receded, they were left behind and with the morning sun rays, they would die. The tide was fresh and the starfish were alive. The

man took a few steps, picked one and threw it into the water. He did that repeatedly. Right behind him there was another person who couldn't understand what this man was doing. He caught up with him and asked, "What are you doing? There are hundreds of starf ish. How many can you help? What difference does it make?" This man did not reply, took two more steps, picked up another one, threw it into the water, and said, "It makes a difference to this one." What difference are we making? Big or small, it does not matter. If everyone made a small difference, we'd end up with a big difference, wouldn't we?

Ask

What did you learn from this story?

Activity

What Motivates You?

- This is an individual activity.
- It is an exercise given in the Participant Handbook.

Do

- Ask the class to open their Participant Handbook and complete the exercise given in the section What Motivates You?
- Ensure that the participants have opened the correct page for the activity.
- Give the class 5 minutes to complet^{e the activity.}

Sav

Discuss the concept of attitude and how to cultivate a positive attitude as discussed in the Participant Handbook.

Summarize



Close the discussion by summarizing how self-analysis, knowledge about what motivates you and your positive at titude can help in your business as well in life.

UNIT 9.1.4: Honesty & Work Ethics

Unit Objectives 🔘

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

- Discuss the qualities of honest people
- Describe the importance of honesty in entrepreneurs
- Discuss the elements of a strong work ethic
- Discuss how to foster a good work ethic

Resources to be Used

Participant Handbook

Ask 🖳

- What do you understand by honesty?
- Why is it important for entrepreneurs to be honest?
- Do you remember any incident where your honesty helped you in gaining confidence?
- Do you remember any incident where someone lost business due to dishonesty?



- Discussed in the Participant Handbook.
- "Let's understand it better with the help of some case scenarios. You will be given some
 cases within your groups. You have to analyse the case scenario that has been given to you
 and then find an appropriate solution to the problem.
- Keep your discussion focussed around the following:

 What went wrong?
 - Who was at fault?
 - Whom did it impact- the customer or the businessman?
 - $\,\circ\,$ How would it impact the business immediately? What would be the long term impact? $\,\circ\,$ What could be done?
 - What did you learn from the exercise?

Do

- Divide the class into four groups of maximum six participants depending on the batch size.
- Give one case study to each group.
- Instruct them to read the case carefully.

- Put down the de-brief questions on the board and ask the groups to focus their discussion around these questions.
- The group is expected to analyse and discuss the case amongst them and find a solution to the given problem.
- Give the class5-10 minutes to discuss the case and note down their solutions.
- At the end of 10 minutes the team should present their case solution to the class. The
 presentation can be a narration or a role play.
- Ask the group to select a group leader for their group. The group leader to discuss and assign roles to the group members for the presentation.

eam Activity 🗱

Case Study Analysis

Scenario 1

Aakash has a small mobile retail sales and repair shop in Allahabad. He has one of the most popular outlets and has great rapport with his customers. It's around 11 AM when a customer barges in to the shop and starts **shouting at Aakash for giving her a faulty** instrument. The screen of her mobile is cracked from one side. Aakash remembered thoroughly checking the handset before handing it over to the customer. The customer threatens to sue him and to go to Consumer Court for **cheating her. Now, the problem occurred somewhere outside the shop**

but as other customers were listening to the conversation, it might impact his business. The situa tion needs to be managed very sensitively. What would you do if you were in Aakash's place?

Scenario 2

Rajni does **beautiful** Phulkari embroidery on suits and sarees. She has a small home-based business. She has a huge list of customers on Facebook and WhatsApp who give her orders regularly. Smita is one of her old and regular customers. As her sister-in-law's weddingwas around the corner, Smita wanted to buy few handcrafted Phulkari duppatta. She placed an order for three duppattas via WhatsApp and requested Rajni to send them as soon as possible. When the parcel reached Smita through courier she found that out of the three duppatas, only one was hand embroidered and the other two had machine embroidery on them. Even the length and the quality of the material was not as desired. Smita was heartbroken. It was a complete waste of money and moreover she couldn't wear what she had planned to during the

wedding functions. She sent a message to Rajni on WhatsApp, expressing her anger and disappointment.

Smita has also sent a feedback and expressed her disappointment on the social media... this will directly affect Rajni's business. What would you do if you were in Rajni's place?

Scenario 3

Shankar is a tattoo ar st who has a small tattoo showroom in a big, reputed mall in New Delhi. Mr Saksham had an appointment for today, at 11:00 am but he reached at 11:50 am. Meanwhile, Shankar had to reschedule his next appointment. After availing Shankar's services, Mr Saksham started yelling in an abusive language, refusing to pay the requisite amount, and finding faults in the services provided by him. Who was at fault in this case? What should Shankar do? Should he confront Saksham or give in to the demands of the client?

Scenario 4

Shailender is an online cloth reseller who does business through social networking sites such as Facebook and WhatsApp. Priyanka made online payment for a dress to Shailander. But she did not receive the dress for a month. When she asked for a cancellation, Shailander started misleading her. For almost 45 days, he kept promising her that he will pay the amount today, tomorrow, day after etc. Even after repeated calls and messages when she did not receive the payment or the dress, she decided to write a post against him on a popular social media platform. As a result, Shailender lost lots of customers and his flourishing business faced a major crisis. How could this situation have been managed?

Say 뎗

- Now, let's discuss the problem and solution with the larger group.
- The group will first briefly describe the case to the class.
- Then discuss the issue iden tified and the proposed solution.
- Once the presentation is over, the class can ask their questions.

- Do 📐

- Congratulate each group for the group presentation.
- Ask the audience to applaud for them.
- Ask de-brief questions to cull out the information from each group.
- Keep a check on time. Tell the group to wind up the discussion quickly if they go beyond the given time limit.

Summarize

- Ask the participants what they have learnt from the exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.
- Close the discussion by summarizing the importance of honesty and work ethics for entrepreneurs.

UNIT 9.1.5: Crea

ova

Unit Objectives

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

- List the characteristics of highly creative people
- List the characteristics of highly innovative people

Resources to be Used

- Participant Handbook
- Chart papers
- Marker pens

Ask 🖳

- You must be aware of the term 'Rags to riches' and heard stories related to the term.
- What do these stories tell us?
- What was so special about these people?

Say 뎗

- Let's have a look at these stories.
- There are some inspiring stories about people which I would like to share with you.
- Narrate these stories to the class.

A.P.J. Abdul Kalam

Who has not heard of A.P.J. Abdul Kalam: Avul Pakir Jainulabdeen Abdul Kalam hailed from a very humble background. His father was a boat owner. To help his family, Kalam would work as a newspaper vendor. With limited resources, he graduated in Physics and studied aerospace engineering. He was instrumental in India's step towards nuclear energy. In 2002, he became the 11th President of India.

Water filter/purifier at source

Two young boys studying in classes 4 and 5, from Lingzya Junior High School, Sikkim designed a simple innovative low cost water purifier.

Inspiration behind the idea: Most people today prefer to use a water filter/purifier at their home. Both the children have given idea to have filter/purifier at the source of water so that everyone has access to clean water without having to make an investment in purchasing a filter/purifier.

Soring's idea is to have a centralized purification system at the point of distribution like water tank while Subash's idea is to have such purifiers attached to public taps.

Source: http://www.rediff.com/getahead/report/achievers-top-31-amazing-innova tionsfrom-young- Indians/20151208.htm

Solar seeder

This is a story of a innovative solar seeder and developed by Subash Chandra Bose, a class 8, student from St Sebasthiyar Matriculation School, Pudukkottai, Tamil Nadu. Subash has developed a solar powered seed drill, which can undertake plantation for different size of seeds at variable depth and space between two seeds.

Source: <u>http://www.rediff.com/getahead/report/achievers-top-31-amazing-innova_tions_</u> <u>from-young- Indians/20151208.htm</u>

Looms for physically challenged

Now this is really inspiring of two sisters, Elakkiya a Class 6 student and Pavithra a Class 9 student of SRC Memorial Matriculation, Erode, Tamil Nadu.

The two sisters have come up with loom for lower limbed physically challenged. In their loom, they have replaced the pedal operated system with a motor and a gearbox attached to a pulley mechanism.

Source: http://www.rediff.com/getahead/report/achievers-top-31-amazing-innovationsfrom-young- Indians/20151208.htm

Ask

- If they can, why can't you?
- Discuss concepts related to 'Creativity and Innovation' with theparticipants as given in the Participant Handbook.

Say 🧧

- Recall the stories on motivation.
- What is the inner drive tha^t motivates people to succeed?
- Let's learn more about such creative and innova tive entrepreneurs with the help of an activity.

eam Activity

- This is a group activity.
- Think of any one famous entrepreneur and write a few lines about him or her.

Activity De-brief

- Why did you choose this particular entrepreneur?
- What is his/her brand name?
- What creativity does he/she possess?
- What was innovative about their ideas?

Do 🗸

- Instruct the participants that this is group work.
- Divide the class into small groups of 4 or 6 depending on the batch size.
- Give each group a chart paper.
- Tell the participants they have to write a few lines about any one famous entrepreneur.
- Give the participants 10 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.
- Ask each group to read out what they have written.
- Ask the de-brief questions.

Summarize 🔎

- Summarize the unit by asking participants if they know of some people who are highly creative and innovative in their approach.
- Ask them to share some experiences about these people with the class.

Notes for Facilitation

Source for stories on innovations:

<u>http://www.rediff.com/getahead/report/achievers-top-31-am</u> azing-innovations-from-young-Indians/20151208.htm

UNIT 9.1.6: Time Management

Unit Objectives 🔘

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

- Discuss the benefits of time management
- List the traits of effective time managers
- Describe effective time management techniques

Resources to be Used

Participant Handbook



Does this sound like you?

- I can never get enough time to finish what I am doing in a day.
- I have so many things to do that I get confused.
- I want to go for a walk and exercise, but I just do not have the time.
- I had so much to do, so I could not deliver that order on time.
- I would love to start my dream business; but, I just do not have the time.

Example

• Let's look at these two examples:

Example 1:

Ankita works from home as a freelance writer. She says she can easily put in 8 hours of dedicated work in a day. Because she works from home, she saves money on travel and has a comfortable work routine. But there is a challenge and it is distraction. As she works from home, she can easily just get up and sit down on the sofa to watch TV, was^{ting} valuable time. She may have chores to do, errands to run and bills to pay. She ends up working only two to three hours a day and the result is, her work gets piled up. She is unable to take on more work due to this. Even though her quality of work is appreciated her clients are not very happy about the delay in submission.

Example 2:

Javed has started a successful online selling company from home and makes a good living from his sales. He has set up a small office space in his living room. As both his parents are working full-time, he also has the role of taking care of his two younger siblings. He almost spends half of his day with the younger kids. He does not mind it but it means taking time away from the work. He is still able to manage his online business with these commitments. He wants to spend some more dedicated hours so as to increase his profits. He also wants to look into new business avenues. What should he be doing.

Ask 🥘

- Does this happen with you too?
- Do you find it difficult to prior^{itize} your work?
- Are you able to manage your time effectively?

Activity 8

- Conduct a group discussion based on the above examples.
- Direct the discussion on how to prioritize work and managetime effectively.

- Say

- Time management is not only about how hard you work but also about how smart you work.
- Discuss "What is Time Management" with the participants as given in the Participant Handbook.

- Ask 🧧

- Why is it important to manage time? How does it help?
- What happens when you don't manage your time effectively?
- Do you find it difficult to prior^{itize} your work?

Say 뎗

- Discuss the benefits of time management given in the Participant Handbook.
- Let's learn effective time management with the help of an activity.

Activity

Effective Time Management

Thisactivity has two parts:

Part 1 To Do List

- You have to make a to-do list.
- List all of the activities/ tasks that you have to do.
- Try to include everything that takes up your time, however uni mportant it may be.
- If they are large tasks, break them into action steps, and write this down with the larger task.
- You can make one list for all your tasks or have separate to -do lists for personal and professional tasks.

PART 2 URGENT-IMPORTANT GRID

- You have to make a grid as shown on the board here.
- This grid has four boxes. As you can see, each box has a different heading.
- At the heart of the urgent-important grid, are these two ques
 - tions: o Is this task important?
 - Is this task urgent?
- Now, you have to think about each activity that you have written in your to-do list and put it into one of the four categories.
- What do these categories depict?
- Category 1: Urgent/Important
 - This category is for the highest priority tasks. They need to get done now.
- Category 2: Not Urgent/Important
 - This is where you want to spend most of your time.
 - This category allows you to work on something important and have the time to do it properly.
 - o This will help you produce high quality work in an efficient manner.
 - The tasks in this category are probably the most neglected ones, but also the most crucial ones for success.
 - The tasks in this category can include strategic thinking, deciding on goals or general direction and planning all vital parts of running a successful business.
- Category 3: Urgent/Not Important
 - This is where you are busy but not productive. These tasks are often mistaken to be important, when they're most often busywork.
 - $\circ~$ Urgent but not important tasks are things that prevent you from achieving your goals. $\circ~$ However, some may be activities that other people want you to do.
- Category 4: Not Important and Not Urgent
 - This category doesn't really include tasks, but rather habits that provide comfort, and a refuge from being disciplined and rigorous with your time management.
 - Some may be activities that other people want you to do.
 - These might include unplanned leisure activities as well.

To – Do List Format

1	
2	
3	
4	
5	
6	





- Do

- Put down the formats for the to-do list and the urgent/ important grid on the board.
- Instruct the participants to prepare their to_do list first.
- Give the participants 10 minutes to prepare the list.
- Once done, instruct them to divide the tasks in to-do list into the four categories.
- Explain the four categories to the participants giving examples specific to their context.
- As you explain the categories fill the grid with the type of tasks.
- Give the participants 40 minutes to fill the grid.
- Then explain how to balance the tasks between the four categories.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Say 痛

Activity De_brief:

How can we balance tasks between the four categories? How to manage time through this grid?

• Category 1: Urgent/Important

- Try to keep as few tasks as possible here, with the aim to eliminate.
- If you spend too much of your time in this category, you are working solely as a trouble shooter, and never finding time to work on longer-term plans.

Category 2: Not Urgent/Important

- o Plan these tasks carefully and efficiently as they are most crucial ones for success.
- If necessary, also plan where you will do these tasks, so that you're free from interruptions.
- Include strategic thinking, deciding on goals or general direction and planning in your planning process.

Category 3: Urgent/Not Important

- Ask yourself whether you can reschedule or delegate them.
- A common source of such activities is other people. Sometimes it's appropriate to say "no" to people politely, or to encourage them to solve the problem themselves.

Category 4: Not Important and Not Urgent

- You also want to minimize the tasks that you have in this category.
- These activities are just a distraction avoid them if possible.
- You can simply ignore or cancel many of them.
- Politely say "no" to work assigned by others, if you can, and explain why you cannot do it.
- Schedule your leisure activities carefully so that they don't have an impact on other important tasks.
- Discuss the traits of effective time managers and effective time management techniques as given in the Participant Handbook.

Summarize 🔎

 Discuss the traits of effective time managers and effective time management techniques as given in the Participant Handbook.

Notes for Facilitation

• Here is a short story. You can conclude the session narrating the story. To make it more interesting you can perform the demonstration described and discuss the short story.

One day an expert in time management was speaking to a group of students. As he stood in front of the group, he pulled out a large wide -mouthed glass jar and set it on the table in front of him. Then he took out a bag of about a dozen rocks and placed them, one at a time, into the jar. Wh en the jar was filled to the top and no more rocks would fit inside, he asked, "Is this jar full?" Everyone in the class said, "Yes." Then he said, "Really?"

He reached under the table and pulled out a bucket of gravel (small stones). He dumped some gravel in and shook the jar causing pieces of gravel to work themselves down into the space between the rocks. Then he asked the group once more, "Is the jar full?" By this time, the class began to understand. "Probably not," one of them answered. "Good!" he replied.

He reached under the table and brought out a bucket of sand. He started dumping the 0 sand in the jar and it went into all of the spaces left between the rocks and the gravel. Once more he asked the guestion, "Is this jar full?" No!" the class shouted. Once again he said, "Good." Then he grabbed a jug of water and began to pour it in un til the jar was filled to the brim. Then he looked at the class and asked, "What is the point of this illustration? "One student raised his hand and said, "No matter how full your schedule is, if you try really hard you can always fit some more things in it!" "No," the speaker replied, "that's not the point. The truth this illustration teaches us is: If you don't put the big rocks in first, you'll never get them in at all. " What are the 'big rocks' in your life? Your children; your loved ones; your education; your dreams; a worthy cause; teaching or mentoring others; doing things that you love; time for yourself; your health; your mate (or significant other). Remember to pu t these BIG ROCKS in first or you'll never get them in at all. If you sweat about the little stuff (the gravel, sand, and water) then you'll fill your life with little things you worry about that don't really matter, and you'll never have the time you need to spend on the big, important stuff (the big rocks).

End the story with these lines...

So, tonight, or in the morning tomorrow, when you are reflecting on this short story, ask yourself this question: What are the 'big rocks' in my life? Then, put those in your jar first.

UNIT 9.1.7: Anger Management

Unit Objectives 🔘

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

- Discuss the importance of anger management
- Describe anger management strategies
- Discuss tips for anger management

Resources to be Used

Participant Handbook

Ask

- What is anger? Is anger good or bad?
- Is anger normal or an abnormal behaviour? How can anger harm you?
- Why is it important for entrepreneurs to manage their anger?

Say 뎗

- Talk about anger and the importance of anger management in entrepreneurs as discussed in the Participant Handbook.
- Let us do a smallactivity. This is an individual activity.
- Think of the incidents and situations that angered you and hurt you.

Do

- Instruct them to note down these situations under different categories (as given in the Activity).
- Give the class 3-5 minutes to think and note down their answers.
- At the end of 5 minutes, ask some participants to volunteer and present their answers.
- They can also share these situations with their fellow participants if they do not wish to share it with the entire class.

Activity 8

- Do you remember any incident which has hurt? o you physically
 - o you mentally
 - o your career
 - your relationships.
Ask 🥘

- Do you ever get angry?
- What are the things that make you angry?
- Do you remember any incident where your anger management helped you in maintaining healthy relationship?
- Do you remember any incident where someone lost business/ friend/ relationship due to temper (anger)?

Say 🔎

- There are a few strategies which can help in controlling your anger. Let's do an
 activity to
 understand the anger management process better.
- This is an individual activity.
- Think of the incidents/ situations which trigger your anger (the cause).
- Then think what happened as a result of your anger (the effect).
- You need to come up with some techniques to manage your anger.

Do

- Give the class the anger triggers (the cause) as listed in the activity.
- Put down the activity format (Anger Triggers, Result of your Anger, Anger Management Techniques) on the board and instruct the class to write the answers under different categories.
- Give the class 3-5 minutes to think and note down their answers.
- At the end of 5 minutes, ask the participants who wish to volunteer and present their answers.

Activity

Trigger points and Anger Management T

echniques Activity Anger Triggers

List of triggers that make you angry:

Someone says you did something wrong.

You want something you can't have now.

You get caught doing something you shouldn't have been doing.

You are accused of doing something you didn't do.

You are told that you can't do something.

Someone doesn't agree with you.

Someone doesn't do what you tell him to do.

Someone unexpected happens that messes up your schedule.

Result of your anger:

Write the techniques that you use to manage your anger:

Anger Management Techniques

Say 🔽

- Now, let's discuss the problems and solution with all.
- The individual will first briefly describe trigger points to the class.
- Then discuss the result of the anger. Other participants are requested to remain quiet while one is making the presentation.
- Post presentation, other participants may ask questions.

Do

- Congratulate each individual for sharing their points.
- Ask the audience to applaud for them.
- Ask de-brief questions after the presentation to the class.
- Keep a check on the time. Ask the participants to wind up the activity quickly if they go beyond the given time limit.

Ask 🖳

De-brief questions:

- In the situation described by the presenter, who was at fault?
- How could you have handled this situation alternatively?

🕤 Summarize 🏼

- Close the discussion by summarizing the strategies and tips of anger management for entrepreneurs.
- Ask the participants what have they learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.

Notes for Facilitation

- Encourage the participants to share information about them while presenting the situations to the class.
- Keep the format of the Activity prepared in a chart paper so that it can be displayed during the session.

UNIT 9.1.8: Stress Management: What is stress?

Unit Objectives 🔘

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

- Discuss the causes of stress
- Discuss the symptoms of stress
- Discuss ^{tips} for stress management

Resources to be Used

Participant Handbook

Ask

- You are w aiting in the reception for an interview or a very important mee ting, suddenly your legs are shaky, your hands are cold, you are feeling ner vous. Have you ever been in this kind of situation?
- Have you had days when you had trouble sleeping?
- Have you ever been so worried about something that you ended up with a terrible headache?

Say 뎗

• You've probably heard people say, I'm really stressed out" or "This is making me totally stressed."

Ask

- What do you understand by stress?
- What gives you stress?
- How do you feel when you are stressed or what are the symptoms of stress?
- How can stress harm you?
- Why is it important for entrepreneurs to manage stress?

Say 💁

- When we feel overloaded or unsure of our ability to deal with certain challenges, we feel stressed.
- Discuss about stress, causes of stress, and symptoms of stress as discussed in the participant Handbook.
- Let's understand the causes of stress and how to deal with them with the help of some case scenarios.

- You will be given some cases.
- You have to analyse the case scenario and then find an appropriate solution to the problem.
- This will be a group activity.

Do

- Divide the class into four groups of 5- 6 participants (depending on the batch size).
- Assign one case scenario to each group.
- Instruct them to read the case carefully.
- The group is expected to analyse and discuss the case amongst them and find a solution to the given problem.
- Explain their discussion should result in get tinganswers for the following ques tions:

 What was/ were the cause(s) of stress?
 - \circ Was the stress avoidable or manageable under the given circumstances?
 - \circ If yes, how do you think that the stress could be avoided (managed)?
 - If no, then why not?
- Give the class 10-12 minutes to discuss the case and note down their solutions.
- At the end of 12 minutes, the team should present their case solution to the larger group.
- Ask the group to select a group leader for their group.
- The group leader to discuss and assign roles to the group members for the presentation.

eam Activity

Case Study Analysis

Scenario 1

Akash's alarm doesn't go off and he gets late ge tting out of the house. He hits traffic and ends up 15 minutes late to work, which his boss notices. He gets to his desk and finds he has to complete 2 reports in next one hour. Just when he is about to begin work, a message pops up "Telecon with the client begins in 10 minutes. Please be in the conference room in 5 minutes ." He is not prepared for the call. He is stressed. He does not want to speak to his boss about this. He is stressed, feeling uncomfortable and sick. Not in a position to attend the call or finish the reports on time.

Scenario 2

While paying his overdue bills, Rahul realised that it's the middle of the month and he has only Rs 500 left in his account. He has already asked all of his friends, and family for loans, which he hasn't paid back yet. He is still contempla^{ting} over the issue when his phone rings. His sister's birthday is due next week and she has seen a **beautiful** dress which she wants to buy but cannot tell the parents as it is a bit expensive. She wishes if Rahul could buy the dress for her. Rahul has promised to buy her the dress for her birthday.

Rahul is stressed, does not understand what to do. He is unable to concentrate on his work and unable to complete the tasks assigned. His team leader has already warned him of the delay.

Scenario 3

Sheela calls the cable company as she has unknown charges on her bill. She has to go through the automated voice mail menu three times and still can't get through to a customer care executive. After 15 minutes of repeated efforts, her call is answered. She explains the entire issue to the customer care executive but before the person could suggest a way out, the call drops.

Now Sheela has to call back and repeat the whole process all over again with a new customer care executive. She is very angry and calls again but cannot connect this time.

She has to leave to office so she decides to call from office and check. When she connects this time, she is angry and argues with the executive on the call. All her co-workers around are looking at her as her volume has suddenly increased. She bangs the phone and ends the call.

Her co-worker Neelam enquires what has happened to her. She ignores her and just walks off. She has become irritable and her behaviour and tone with other co-workers is not acceptable.

Scenario 4

Arpit is a young entrepreneur who started doing business through Facebook few weeks back. He had always been into a job. Although Arpit has very few financial **liabilities**, it wasn't an easy decision to leave a comfortable job at once and look for newer pastures. Arpit's boss warned him of the consequences and the challenges of star ting a business when nobody ever in his family had been in business.

He has not been able to get a good deal till now. This is an important lifeshift for him which comes with unknown variables. Arpit is nervous and is wondering if he has what it takes to fulfill the requirement of his new role, or the new experiences he's likely to face.

Ask 🖭

De-brief questions:

- What was/ were the cause(s) of stress?
- Was the stress avoidable or manageable under the given circumstances?
- If yes, how do you think that the stress could be avoided (managed)?
- If no, then why not?

Say

- Now, let's discuss the problem and solution with the larger group.
- The group will first briefly describe the case to the class.

- Then discuss the issue iden tified and the proposed solution.
- Post presentation, the other groups may ask questions to the group that has presented.

Do

- Congratulate each group for sharing their points.
- Ask the audience to applaud for them.
- Ask de-brief questions to cull out the information from each group.
- Keep a check on time. Tellparticipants to wind up the discussion quickly if they go beyond the given time limit.

Say 🗣

- While it is common and normal to feel some tension. This feeling nervous and tensed can interfere with your thinking process and can have a negative impact on your performance.
- Stress can deplete the most vibrant of souls. It can have a negative effect on every aspect
 of a person's life including their health, emotional well-being, relationships, and career.
 However, one needs to understand the causes and types of stress before looking for
 ways to manage it.

De-brief:

Scenario 1

The cause of stress was lack of time management and the habit of procrastina ting. If Akash would have managed histime well, planned alternate ways to get up on time, finished prior tasks on time and planned for client mee tings in advance then he wouldn't have faced stress.

Scenario 2

The cause of stress was lack of financial planning. Rahul should have planned his financial resources well in advance and saved some money for the rainy day. Also, differen tiating between needs and wants and keeping a check on non-essen tial expenditure would have saved Rahul from this situation.

Scenario 3

Some times, stress is caused due to external factors instead of internal ones. In this case, the

stress was unavoidable because we have no control over this customer care system. Every time, you will get in touch with a new executive and will have to explain all over again. This might cause stress but despite being frustrated and angry there is little that we can do about it. All Sheela could do was to find ways to calm herself down through some breathing exercises and m editation, reading some good book or listening to music and then start afresh.

Scenario 4

A **positi**ve, major life change can be a source of good stress. Regardless of how good the change is, it can be stressful. Stress caused by a **positi**ve and major life change can be beneficial because it causes a person to step out of their comfort zone and learn new skills. Here, Arpit may become a successful entrepreneur or learn new ways to do things differently. Now let us see this scenario, can I have a volunteer to read out this case to the class

Do

• Ask one of the participant who can volunteer and read out this scenario to the class.

Scenario 5

Rakesh lives in Kathmandu with his wife and two beautiful daughters Sarah and Sanya. Nepal was hit by a massive earthquake and Rakesh's building collapsed during the earthquake. During evacuation, Rakesh realised that though his wife and Sarah were fine and suffered only minor bruises, Sanya was nowhere in the scene. Panic stricken, he started calling her name and searching her frantically. A little later, he heard a meek voice from beneath the debris. He quickly removed the rubble to find a huge bed. Rakesh was pretty sure that Sanya was trapped underneath. Though he was badly bruised, he gathered all his courage and with all his might, he lifted the several-ton bed to save Sanya's life. Everyone was relieved to see Sanya alive and also extremely surprised to see this father's ability to access superhuman strength.

- Ask the audience to applaud for the participant after the scenario is read completely.
- Discuss the scenario, ask de-brief questions:
 - What kind of stress was Rakesh undergoing in this case?
 - \circ Was the stress avoidable or manageable under the given circumstances?
 - What was the result of the stress?

De-brief:

Sav

 Not all stress is harmful; good stress is actually energizing. This was a case of lifesaving stress, or hero stress, which is an important example of good stress. You may have heard stories in which a person performs an impossible feat of physical strength in order to save their life or the life of someone they love. This type of stress causing a surge of adrenaline is good for us.

Summarize

- Close the discussion by summarizing the tips to manage stress as given in the Participant Handbook.
- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.

Notes for Facilitation

- Keep printed copies of the activities/ scenarios ready for the session.
- Put down the de-brief questions on a flip chart so that it can be displayed in the class during the activity.
- Encourage participation and make the discussions interactive.

UNIT 9.2: Digital Literacy: A

Recap Key Learning Outcomes

At the end of this unit, participants 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. Identify different types of e-commerce
- 8. List the benefits of e-commerce for retailers and customers
- 9. Discuss Digital India campaign will help boost e-commerce in India
- 10. Describe how you will sell a product or service on an e-commerce platform

UNIT 9.2.1: Computer and Internet Basics: Basic Parts of a Computer

Unit Objectives 🔘

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

- Identify the basic parts of a computer
- Identify the basic parts of a keyboard
- Recall basic computer terminology
- Recall the functions of basic computer keys

Resources to be Used

- Participant Handbook
- Computer Systems with the required applications

Say 🤦

- Let's take a quick recap of the basic computer parts.
- Discuss 'Basic Parts of Computer' and 'Basic Parts of a Keyboard' with the class as given in the Participant Handbook.

Explain

• Explain all the parts of the computer and the keyboard by demonstrating on the real system.

Ask

- Do you know about internet?
- Have you ever used internet?
- Why do you think internet is useful?
- What was the last task you performed on internet?

Say 4

- Let's look at some basic internet terms.
- Discuss 'Basic Internet Terms' with the participants as given in the Participant Handbook.

Summarize 🖉

- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.

• Close the discussion by summarizing the importance of computer and internet for entrepreneurs.

Practical %

- Conduct a practical session.
- Ask the participants to assemble in the computer lab.
- Give some hands-on practice exercises.

Do 🗸

- Group the participants for the activity depending on the batch size and the number of computer systems available in the lab.
- Explain the purpose and dura tion of the activity.
- Ensure the participants complete the practical exercises assigned.

UNIT 9.2.2: MS Office and Email: About MS Office

Unit Objective

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

- Discuss the main applications of MS Office
- Discuss the benefits of Microsoft Outlook

Resources to be Used

- Participant Handbook
- Computer Systems with the required applications

Ask

- What is the most frequent activity that you do on the computer?
- Do you know how to make presentations on the computer?

Say 🤦

- Give a brief introduction of MS Office as given in the Participant Handbook.
- Discuss the most popular office products. Explain in brief their application, benefits and working.
- Micr osoft Word is a word processing program that allo ws for the creation of documents. The program is equipped with templates for quick formatting. There are also features that allow you to add graphics, tables, etc.
- Micr osoft Excel is a tool for accounting and managing large sets of data. It can also simpli
 fy analysing data. It is also used to create charts based from data, and perform complex c
 alculations. A Cell is an individual data box which will have a corresponding Column and
 Row heading. This gives the cell a name, referred to as the Cell Reference. T here can be
 multiple pages in each workbook. Each page, or sheet, is called a Worksheet. When you
 open a new Excel file, it automa

tically starts you with three worksheets, but you can add more.

Explain

• Explain the working and frequently used features of Office on a real system.

Ask

- What do you know about e-mails?
- Do you have an email id?
- How often do you check your e-mails?

Say 🔎

- Communica tion is vital for every business. The fastest and the safest way to communicate these days are through emails. MS Outlook helps to manage your emails in a better way and also offers a host of other benefits.
- Discuss "Why Choose Microsoft Outlook?" with the participants as given in the P articipant Handbook.

Do 💆

- Ask the participants to assemble in the computer lab.
- Explain the working of Outlook on a real system.

Demonstrate

- Demonstrate how to create email id.
- Demonstrate how to write new mails, send mails.
- Demonstrate how to use MS Office application to create a letter and send it as attachment in an email.
- Demonstrate how to use other MS Office applications.

Practical %

- Give some hands-on practice exercises
- Group the participants for the activity depending on the batch size and the number of computer systems available in the lab.
- Explain the purpose and duration of the activity.

Summarize

- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have

UNIT 9.2.3: E-Commerce

Unit Objective

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

- Iden^{tify different typ}es of e-commerce
- List the benefits of e-commerce for retailers and customers
- Discuss Digital India campaign will help boost e-commerce in India
- Describe how you will sell a product or service on an e-commerce platform

Resources to be Used

- Computer Systems with internet connection
- Participant Handbook

Ask 🦳

- How many of you have done shopping online?
- Can you name at least five shopping websites?
- What is the product that you most frequently buy online?
- Why do you do shopping online instead of going to the market?

Say 煏

- Give a brief introduction of "What is E-commerce". Refer to the Participant Handbook.
- E- commerce emerged in the early 1990s, and its use has increased at a rapid rate. Today, many companies sell their products online. Everything from food, clothes, entertainment, furniture and many other items can be purchased online.

Ask

 What other types of tr ansactions have you performed on the internet other than buying products?

Say 🚘

Give examples of e-commerce activities from Participant Handbook.

eam Activity

E-commerce examples

Instruct the participants to list some of the payment gateways that they have used for e
 - commerce activities.

- Give them 5 minutes to make this list.
- Discuss payment gateways and transaction through payment gateways.
- Conclude the discussion by mentioning how important e-commerce has become in our day to day transactions.

Say 🗖

- E-commerce activities can be classified based on the types of participants in the transaction.
- Discuss "Types of E-commerce" from the Participant Handbook.

Do

- Discuss all types of E-commerce by giving examples and names of some popular websites which use them.
- Make the discussion interactive by asking the class to share some popular e-commerce sites of each type.

Say 🚘

- E-commerce activities bring a host of benefits for both, retailers and customers.
- Discuss benefits of E-commerce from the Participant Handbook.

Explain

- The majority of the population that uses E-commerce activities lives intier-1 and tier-2 cities. To encourage the use of digital money in tier-3 and 4 areas, PM Mr. Modi launched the "Digital India Campaign".
- Discuss "Digital India Campaign" from the Participant Handbook.
- By Digital India project the government will deliver services via mobile connectivity and in doing so, is expected to bring the internet and broadband to remote corners of the country. This connectivity will in turn enhance e-commerce activities also. Furthermore, the Indian Government is also modernizing India Post and aims to develop it as a dis tribution channel for e-commerce related services.

- Say 🗣

- Now let us discuss how to sell a product using E-commerce.
- Every product has to be sold on a platform on the internet. Think of it as a shop that you have to sell your product. Now this shop can be your own or shared or rented. If the shop is your own or rented there will be only your products in that shop. If the shop is shared, there will be products of multiple sellers in that shop. A common example is a departmental store which has products from multiple brands in the shop.

- Similarly, in E-commerce the shop is the website where your products are displayed. If it is your own website it will exclusively showcase your products. In this case the cost that you will incur will be:
 - Developing the website
 - Hosting the website
 - Maintenance of the website
- If you rent a website it will also showcase your own products but the development, hos

ting and maintenance parts goes to the owner. This saves time and the cost to manage these activities.

- Smaller companies usually go for ren ting a website and the bigger ones develop their own website.
- The concept of shared platforms has become very popular in recent times. In this platform, the sellers have to register and then they can sell their goods on a common platform. Among the most popular of these are Amazon, Myntra, Flipkart, etc.

- Role Play 🗐

- Tell the participants to choose a product or service that they want to sell online.
- Tell them to write a brief note explaining how they will use exis^{ting} e -commerce platforms, or create a new e- commerce platform to sell their product or service.

- Ask 🖳

- How much money are you carrying in your wallet?
- Do you have a credit/debit card?
- How do you make payments while doing online shopping?

Say 💁

- Demonetization has made carrying cash in the wallet very difficult. People either shop through cards or some other form of digital money.
- So, what do you think is digital money?
- In this form, the money is both paid and received digitally. There is no hard cash involved. It is an instant and convenient way to make payments.
- There are various types of digital payments. Let us discuss some of them in brief here.
- The first one is the most commonly used system i.e. the cards. Debit card, credit card, prepaid card, all fall under this category.
- Then is the e-wallet or the mobile wallet. This has become the most used form of digital money after demonetization. Examples are Paytm, state bank buddy, Freecharge, etc.
- Many other forms of digital money are also coming up in market like m obile apps, Aadhar card based payment, etc.

Do

• Demonstrate how to make and receive payments through digital models like Paytm and state bank buddy.

Ask

• Why do you think people have started using digital money instead of hard cash? Is demonetization the only reason?

Say 🤦

- Digital money gives a lot of advantages over the conventional hard cash. Some of them are:
 - Digital payments are easy and convenient. You do not need to take loads of cash with you, a mobile phone or a card will suffice.
 - With digital payment modes, you can pay from anywhere any time.
 - Digital payments have less risk.

Summarize

- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.
- Close the discussion by summarizing the importance of e-commerce and digital money.

UNIT 9.3: Money Matters

Key Learning Outcomes

At the end of this unit, participants 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 investmen^t 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 transfer

UNIT 9.3.1: Personal Finance – Why to Save?

Unit Objective

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

- Discuss the importance of saving money
- Discuss the benefits of saving money

Resources to be Used

Participant Handbook



- How many of you save money?
- Why do you feel the need to save it?
- Do you plan your savings?
- Where do you keep the money you save?
- How do you use the money that you have saved?

Example

Let's look at these two examples:

Example 1:

Suhani works in a good company and earns Rs.30, 000 month. She always saves 5000 per month and keeps it aside as a personal saving. She keeps the money at home and has saved quite a lot. One day her mother has a medical emergency and has to be taken to the hospital. Her family is worried about the amount they have to spend for the treatment. It will cost them atleast 40,000.

Suhani says tells her family not to worry and that she has about 50,000, which she has saved over the months.

Example 2:

Jasmeet works in the same company and earns the same as Suhani. She is very fond of shopping and spends most of her money on buying new clothes. At the end of the month, she is always asking her father for money as her pay is finished.

Ask 🖳

- Who do you iden tify with –Suhani or Jasmeet?
- How do you think Suhani manages to save money which Jasmeet is unable to do?

Say ⊆

- We should always set aside some and save some money from our monthly pay. The future is unpredictable. Saving money not only gives you a sense of financial security but it can be used in case of emergencies.
- Discuss "Importance of Saving" with the participants as given in the Participant Handbook.

Ask

- What are the benefits of saving money?
- What does being financially independent mean to you?

Say 🤦

- Discuss "Benefits of Saving" with the participants as given in the Participant Handbook.
- Now let us continue with Suhani's story. Suhani has told he r family not to worry and that she has about 50,000, which she has saved over the months. The family is happy about Suhani's decision of saving money, which will be of great help for them now. Suhani is going to the hospital today to pay the first instalme nt for the treatment. Suddenly finds only 35,000 in her cash box when she counts and does not remember using it. She has not kept any record and now she is upset.

Ask 🖳

- Was it a good decision by Suhani to save a part of her earnings every month?
- Was it a wise decision to keep all her savings as cash in a cash box?
- Could she have managed to save money in a better and more effective manner?
- Do you want to learn how to save money and use it effectively?

– Say

Let's learn personal saving with the help of a groupactivity.



Personal Finance- Why to save

• Thisactivity has two parts:

PART 1

WAYS TO SAVE MONEY

- You are earning 30,000/ per month. You have recently changed your job and have to move to a metropolitan city. You are now li ving as a paying guest paying 8,000/- per month. Your other estimated expenditures like travel, food, recreation would be around Rs. 17, 000 per month.
- Make a list of different ways to save money.

PART 2 HOW WILL YOU USE THE MONEY?

- After a year how much have you been able to save?
- How will you use the money that you have saved?

Do 🔽

- Divide the class into groups of four.
- Instruct the participants to think and prepare a list of the various ways they can save money.
- Give the participants 10 minutes to prepare the list.
- Once done, instruct them to think of how they could use the money they have saved.
- Give the participants 10 minutes to prepare the list.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Activity De-brief

- What were the different ways you could save money?
- How much money were you able to save?
- How will you use the money you have saved in one year?

Say 🞑

• Discuss the importance of personal finance and why it is important to save money.

Summarize

You can summarize the session by discussing:

- The importance of saving money.
- Ways to save money.
- How the money saved can be used for different purposes.

UNIT 9.3.2: Types of Bank Accounts, Opening a Bank Account

Unit Objective 🞯

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

- Discuss the main types of bank accounts
- Describe the process of opening a bank account

Resources to be Used 🦉

- Account opening sample forms
- Participant Handbook

Ask 🖳

- How many of you save money?
- Where do you keep the money you save?
- How many of you have a bank account?
- What type of account do you have?

Example 💡

• Let's look at the given example:

Reena is in the third year of college but in the evening, she gives tuitions for children living in her colony. She earns 15,000/ - per month. As her students stay in different parts of the city, she has to walk a lot.

To save time, she decides to buy a second hand scooter for herself. But she has to save money for it. Her class mate advises her to open a recurring deposit account in the bank.

She goes to the bank close to her home. The personal manager gives her some forms to fill. She is confused as she has never done this before. Her elder sister has an account in the same bank. She asks for help from her sister. She goes to the bank the next day with her sister. The personal banker gives her a list of documents that she will need to submit with the form for opening an account. The banker advises her to open a 6 months recurring deposit.

- Ask 🖳

- Do you try to save money monthly but have to spend it on unforeseen expenditure?
- Have you ever thought of depositing your savings in a bank?

Say 뎗

- Before opening a bank account, you need to know the types of accounts we have in India.
- Discuss "Types of Bank Accounts" with the participants as given in the Participant Handbook.

Ask 🔍

• Can someone say what are the different types of bank accounts?

- Say 🖸

Let's learn about the different types of bank accounts through anactivity.

eam Activity

- Divide the class in four groups.
- Label the groups as savings account, current account, recurring account and fixed deposit.
- On a chart paper, ask them to write the key points of their account.

Activity De-brief

• Ask each group to present the key points of their account.

Say

- Now that you know about the four different types of accounts, let's learn how to open a bank account.
- Discuss "Opening a Bank Account" with the participants as given in the Participant Handbook.
- Discuss "Tips" that the participants should keep in mind while opening a bank account as given in the Participant Handbook.

– Ask 🤇

- What are the main documents required for opening a bank account?
- What are some important points to ask the bank personnel while opening an account?

Say 뎗

- Mention officially valid KYC documents (refer to the Participant Handbook)
- Now, let's understand the procedure of opening a bank account through an activity.

eam Activity 👥

Opening a Bank Account

- This activity is done in groups.
- Divide the class in groups of four or six

PART 1

FILLING A BANK ACCOUNT OPENING FORM

- You have to fill a bank opening form.
- You can refer to the section "Opening a Bank Account" of your Handbook for reference.
- List all the steps that you will be required to fill in the form.
- List the documents that you need for filling the form.
- Now fill in the form.

Activity De_brief

How did you design the form?

- What all details did you fill in the form?
- What were your KYC documents?
- How would this activity help you in future?

Do 🔽

- Instruct the participants to read the section "Opening a Bank Account' of the P articipant Handbook.
- Give each group one sample account opening form.
- Give the participants 5 minutes to read the form.
- Give them 15 minutes to fill it.
- Assist them by explaining each category and how to fill it.
- Keep a check on time.
- Tell the group to wind up quickly if they go beyond the given time limit

- Summarize 🎚

Note:

- You can summarize the unit through a role play.
 - A person wan ting to open an account in the bank.
 - o What is the procedure that he will go through?
 - $\circ~$ Discuss the key points of different types of bank accounts.
 - $\circ~$ How to select the type of account
 - How to fill the account opening form.

Photograph			XX	X Banl
	SAVING BAN	IK ACCOUNT OPE	NING FORM	
ccount No.:			Date:	
Name of the Branch				
Village/Town				
Sub District / Block				
Name				
State				
SSA Code / Ward No.				
Village Code / Town		Name of Village	e /	
Code		Town	-,	
pplicant Details:				
Full Name Mr./Mrs./	First	Middle		Last Name
Marital StatusMs.	-			
Name of				
NameSpouse/FatheofMother				
Address				
Pin Code				
Tel No. Mobile			Date of Birth	
Aadhaar No.			Pan No.	
MNREGA Job Card No.			-	
Occupation/Profession				

Detail of Assets	Owning Hous Y/N	e :	Y/N	Owning Farm	-
Existing Bank A/c. of family members / household	Y	/ N	If y	ves, No. of A/cs.	
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UNIT 9.3.3: Costs: Fixed vs. Variables: What are Fixed and Variable Costs?

Init O	bjective	Ø
		-

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

Differentiate between fixed and variable costs

- Resources to be Used 🖉

- Participant Handbook
- Blank sheets of paper
- Pens

- Ask 🦲

- What is cost?
- Will a telephone bill fall under the category of a fixed or variable cost?

Say 뎗

• Discuss: Fixed and Variable cost with examples. Let us do a small activity.

Team Activity 🙀

Identify the type of cost

- 1. Rent
- 2. Telephone bill
- 3. Electricity bill
- 4. Machinery
- 5. Insurance
- 6. Office supplies/ Raw materials
- 7. Employee salaries
- 8. Commission percentage given to sales person for every unit sold
- 9. Credit card fees
- 10. Vendor bills

Do 🗹

- Divide the class into two groups. Read out the list of costs given in the activity.
- Read out each item from the cost list and ask the groups in turns to identify whether it is a fixed or variable cost.

Say 뎗

- We saw that your utility bills like rent, electricity, telephone etc. are all fixed costs because you have to pay it every month.
- Variable costs is an expense which varies with production output or volume. For example, commission, raw material etc.
- Discuss "Cost: Fixed vs. variables" with the participants as given in the Participant Handbook.
- Illustrate the relation between the costs with a graph.



Let's learn the difference between fixed and variable cost with the help of an activity.

eam Activity 🍂

Fixed vs. Variable Costs

- This is a groupactivity.
- You want to start your own entrepreneur business.
- State the type of business you want to start.
- List down all the cost or requirements for your business.
- How will you differentiate between the fixed and variable cost.

Activity De_brief

- What is the total cost of your business?
- What are the fixed costs?
- What are the variable costs?
- How did you differentiate between the fixed and variable costs?

Do 🔽

- Instruct the participants that this is group work.
- Divide the class into small groups of 4 or 6.
- Give each group a sheet of paper.
- Tell the participants that they have to start their own entrepreneur business.
- Ask them the type of business they want to start.
- Instruct them to differentiate between the fixed and the variable costs of the business they want to start.
- Give the participants 15 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Summarize

 Note: You can summarize the unit either by having a role play between a consultant and a budding entrepreneur explaining the differences between fixed and variable costs or by discussing the key points of the unit.

Notes for Facilitation

Answers for the activity - Identify the type of cost

1.	Rent	(Fixed)
2.	Telephone bill	(Fixed)
3.	Electricity bill	(Fixed)
4.	Machinery	(Fixed)
5.	Insurance	(Fixed)
6.	Office supplies/ Raw materials	(Variable)
7.	Employee salaries	(Fixed)
8.	Commision percentage given to sales person for every unit sold	(Variable)
9.	Credit card fees	(Variable)
10.	Vendor bills	(Variable)

UNIT 9.3.4: Investments, Insurance and Taxes

Unit Objective

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

- Describe the main types of investment options
- Describe the different types of insurance products
- Describe the different types of taxes

Resources to be Used

Participant Handbook

Ask 🖳

- Ask the **participants** "What do you see first thing in when you get your mobile bill? Apart from the amount and due date do you have a look at the taxes you are being billed for?
- Why do you think people get their cars insured or have a medical insurance?
- You have saved money and want to invest it; how would you decide what is the best investment for your money?

Example 💡

• Let's have a look at a few scenarios.

Ranbir has sold his house and deposited the money in his bank. His Chartered Accountant tells him that he will have to re-invest the money otherwise he will have to pay capital tax. What is capital tax and how is it different from income tax?

Jasmeet and Anup are blessed with a baby girl. They decide to have an insurance policy that will mature when their daughter is ready to higher education.

Shivani is working in a corporate office and get ting good pay. She will have to pay income tax so she decides to invest her money in tax saving schemes. She goes to the bank manager to discuss the best products in which she can invest.

- Say 痛

Discuss the Investment, Insurance and Taxes as given in the Participant Handbook.



eam Activity 👥

- The activity is a quiz.
- Do 📐
 - Divide the class into groups of three and give a name to each group
 - Explain the rules of the quiz. For each correct answer, the group gets 1 mark. If the group is unable to answer the question is rolled over to the next group.
 - Explain the purpose and duration of the activity.
 - On the blackboard write the names of the groups.
 - Ask the ques^{tions} of the quiz.
 - Keep a score for the groups.
 - Set guidelines pertaining to discipline and expected tasks.

Summarize

Summarize the unit by discussing the key points and answering question

Notes for Facilitation

Questions for the quiz

- 1. Mr. Das gets monthly return on one of his insurance policies. Name the policy? *Money Back Life Insurance*
- What are bonds?
 Bonds are instruments used by public and private companies to raise large sums of money.
- Who issues the bonds?
 Private and public companies issue the bonds.

- 4. Why are bonds issued?*To raise large amount of money as it cannot be burrowed from the bank.*
- Who is the buyer of stocks and equifies?
 The general public is the buyer.
- 6. What types of scheme is the Sukanya Samriddhi Scheme? *Small Saving Scheme*
- 7. What is the difference between mutual and hedge funds? Mutual funds are professionally managed financial instruments that invest the money in different securities on behalf of investors. Hedge funds invest in both financial der lvatives and/or publicly traded securities.
- Why is a loan taken from the bank to purchase real estate?
 To lease or sell to make profit on appreciated property price.
- 9. Name the two types of insurances? Life Insurance and Non-life or general insurance
- 10. Which insurance product offers financial protection for 15-20 years? *Term Insurance*
- 11. What is the benefit of taking an endowment policy? *It offers the dual benefit of investment and insurance*.
- 12. What are the two benefits of a Whole Life Insurance? *It offers the dual benefit of investment and insurance*
- 13. Which policy covers loss or damage of goods during transit? *Marine Insurance*
- 14. After what duration is the income tax levied? *One financial year*
- 15. What is long term capital gain tax? It is the tax payable for investments held for more than 36 months.
- 16. Name the tax that is added while buying shares? Securities Transaction Tax
- 17. What is the source of corporate tax?

The revenue earned by a company.

- Name the tax whose amount is decided by the state? VAT or Value Added Tax
- 19. You have bought a T.V. What tax will you pay? *Sales Tax*
- 20. What is the difference between custom duty and OCTROI? *Custom duty is the charges payable when importing or purchasing goods from another country. OCTROI is levied on goods that cross borders within India.*

UNIT 9.3.5: Online Banking, NEFT, RTGS, etc.

Unit Objective

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

- Discuss the uses of online banking
- Discuss the main types of electronic funds transfer

Resources to be Used

- Participant Handbook
- Computer System with internet connection
- Debit card

Ask 🖳

- When was the las^t time you visited a bank?
- How do you pay your bill for electricity and telephone?
- Have you ever tried to transfer money from one bank account to another bank acco unt using the online banking facility?

Say 🗟

 Most of us lead a busy life. Time has become more important than money. In this busy schedule, no one has time to stand in bank queues. That's where Online Banking comes

in. Online banking or internet banking means accessing your bank account and carrying out financial transactions through the internet.

- Discuss "What is online banking?" from the Participant Handbook.
- There are various advantages of online banking:
 - It saves time, as you need to visit the branch.
 - You can conduct your banking transactions safely and securely without leaving the comfort of your home.
 - Online Banking also gives you round the clock access.
 - Online Banking makes it possible for you to pay your bills electronically.

Do

- Show them how they can use the internet banking.
- Use the computer system and show the demo videos on how to use internet banking provided on most banking sites. the computer system.
- Tell the class the various features of online banking :
 - Through their website set-up your online account.

- Choose a secure username and password.
- Set-up your contact information.
- Once your information is verified, you are good to go.
- Once you enter the portal explore all the features and learn your way through the portal.

Say 🔎

- One of the biggest advantage that online banking offers, as discussed earlier, is transferring money from one account to another. This transaction is called electronic funds transfer. Electronic transfers are processed immediately with the transferred amount being deducted from one account and credited to the other in real time, thus saving time and effort involved in physically transferring a sum of money.
- Discuss "Electronic Funds Transfer" from the Participant Handbook.

Do

- Discuss how to transfer money from one account to another using online banking (NEFT/ RTGS, etc.).
- Illustrate with an example.

Summarize 🔎

- Close the discussion by summarizing the about online banking.
- Ask the participants if they have any questions related to what they have talked a bout so far.
UNIT 9.4: Preparing for Employment & Self-

Employment Key Learning Outcomes

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

- 1. Discuss the steps to follow 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. Identify basic workplace terminology

UNIT 9.4.1: Interview Prepara

Interview?

Unit Objective

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

• Discuss the steps to follow to prepare for an interview

Resources to be Used

Participant Handbook

Ask

- Have you ever attended an interview?
- How did you prepare before going for an interview?

Say 🦻

- An interview is a conversation between two or more people (the interviewer(s) and interviewee) where questions are asked by the interviewer to obtain information from the interviewee.
- It provides the employer with an opportunity to gather sufficient information about a candidate and help them select the ideal candidate.
- It also provides the interviewee with an opportunity to present their true poten tial to the employer, build confidence and help make a decision about the job by asking questions regarding designation, salary, perks, benefits, promotions, transfers, etc.
- Let's do an a^{ctivity} to understand how to prepare for interviews better.

Activity 1

• Introducing Yourself

Do

- Select a participant and ask him/her to answer the following questions: "What can you tell me about yourself."
- Give the participant at least one minute to speak.
- Once he/she is done, ask the rest of the participant what they gathered about the
 participant who was providing information.
- Now repeat the exercise with five other participants.

Ask What information you should include when you are describing or introducing yourself in an interview? What information you should not include when you are describing or introducing yourself in an interview? Sav Tell the participants that when an interviewer asks you to say something about yourself, he/she is not asking you to present your life history. Introduction should be short and crisp, and should present you in a positive light. It should include the following points: • Any work experience that you might have A brief summary of your educational qualifications • Your strengths and achievements Any special projects that you might have been part of The following topics should be avoided during an introduction: • Detailed description of your family (unless you are specifically asked to do so) Too much information about your weaknesses Information that is not true \cap Do Congratulate each participant for sharing their points. Ask the audience to applaud for them. Ask de-brief questions to cull out the information from each group. Keep a check on time. Activity 2 Planning the right at the Do

Describe 2 individuals to the participants. One is wearing a casual t-shirt, jeans, and slippers. He has not combed his hair and neither has he trimmed or shaved his beard. The other individual is dressed formally with a shirt and pant, and is well-groomed. He has also worn formal shoes and a belt. Ask the participants which person would they prefer to hire in their organization and why?

- Summarize 🗵

- Close the discussion by discussing 'how to prepare for an interview' as discussed in the Participant Handbook.
- You can add the following points to it:
 - Tell the participants to create a positive and good impression in an interview. It is important for them to prepare for an interview beforehand.
 - The interviewer analyses not only your technical knowledge in relation to the job, but also whether or not you are a fit for the organization.
 - Every employer looks at the whole package and not just one or two things in isolation. Therefore, the way you dress and the way you present yourself is also important along with your skills and talents.
 - The participants will get only one chance to create a good first impression.

UNIT 9.4.2: Preparing an Effective Resume: How to

Create an Eff

Unit Objective

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

Discuss the steps to create an effective Resume

Resources to be Used

- Participant Handbook
- Blank Papers
- Pens

Ask 🦲

- When preparing for an interview, what are the most important things that you need to do?
- What documents do you carry with you, when you go for an interview?
- What is a resume?
- Why do you need a resume?

Say 🞑

- Resume is not just a sheet of paper with your qualifications printed on it.
- It is a selling tool that will help the employer to see how and what you can contribute for company.
- Talk about the steps involved in creating an effective/attractive resume discussed in the participant Handbook.
- Now let's prepare a resume to understand the process in a better way.

Do

- This is an individual activity.
- Give the details of the activity.
- Instruct them to read the activity carefully.
- The participant is expected to make an attractive resume based on the informatio n provided.
- Give the class 25-30 minutes to study the case and create a resume.
- At the end of 30 minutes, the participants should exchange the resume with the person sitting next to him or her.
- Every participant will evaluate the resume prepared with their fellow participants.

Say 痛

- Do you think the candidate should apply for the job posting described in the advertisement?
- We have already discussed the steps involved in creating an effective/attractive resume.
- Now let's prepare a resume for the candidate details given in the activity.

Activity 🏼

Case Study Analysis

- In the first section of the activity, you are being given the information about a candidate who is applying for a particular job.
- In the second section, you are being given the detailed description of the job posting.
 Create a resume for the candidate to apply for the job posting.
- Use the information that has been provided about the candidate to create this resume

Candidate Details

Nipesh Singla was born on 20th April, 1988 in Chandigarh, India. He currently resides at 1XX7, Sector XX D, Chandigarh –160018. His mobile number is 988XXXXX01, and e-mail address is nxxxxxxxla@gmail.com. Nipesh attended middle and senior school at Government Boys Senior Secondary School, Sector 15, Chandigarh. He has been a very talented boy since

school. He was fond of pain^{ting} and watching old Hindi movies. As part of a school charity program, he volunteered at the children's hospital during his senior years.

In July 2007, he joined Westwood School of Hotel Management, Zirakpur to pursue a diploma course in Hotel Management and Catering. After comple^{ting} this course, he joined XYZ Group of Hotels as a Housekeeping intern in June 2010 for six months. In this role, he was responsible for cleanliness and maintenance of one floor in the hotel. Taking advantage of his strong

interpersonal skills, he also got opportunities to make housekeeping arrangements for corporate mee^{tings}. While pursuing education, he gained working knowledge of Microsoft Word, Excel, Access and PowerPoint.

Nipesh is detail-oriented, flexible and adaptable. He has successfully worked with a diverse work force. He gelled well with his peers, both in college and during his internship. After

completing the internship, his objective has been to find a job opportunity where he can use his skills and experience. Backed by experience, he is confident about his skills as housekeeping assistant.

Job Posting

*Do you see yourself as a HOUSEKEEPING SUPERVISOR?

What's your passion? Whether you're into cricket, reading or hiking, at IHG we are interested in YOU. At IHG, we employ people who apply the same amount of care and passion to their jobs as they do in their hobbies people who put our guests at the heart of everything they do. And we're looking for more people like this to join our friendly and professional team.

THE LOCATION:

At the moment, we are looking for HOUSEKEEPING SUPERVISOR to join our youthful and dynamic team at Holiday Inn Amritsar, Ranjit Avenue in Amritsar, Punjab (India). Holiday Inn Amritsar is ideally located in Amritsar's commercial district on Ranjit Avenue with the world famous Golden Temple located only a short distance away. Sparkling chandeliers mark an incomparable arrival experience as you escape to the welcoming environment that is, Holiday Inn Amritsar. The fresh international brand to celebrate and explore Amritsar. *Salary:* Negotiable

Industry: Travel / Hotels / Restaurants / Airlines / Railways

Functional Area: Hotels, Restaurants

Role Category: Housekeeping

Role: Housekeeping Executive/Assistant.

Desired Candidate Profile

Friendly, pleasant personality, Service - oriented.

You should ideally be Graduate/ Diploma holder in HM and at least 2 years of experience as a supervisor in good brand with good communication skills, English is a must.

In return we'll give you a competitive financial and benefits package. Hotel discounts worldwide are available as well as access to wide variety of discount schemes and the chance to work with a great team of people. Most importantly, we'll give you the room to be yourself.

*Please get in touch and tell us how you could bring your individual skills to IHG. Education-UG: Any Graduate/ Diploma holder

PG: Post Graduation Not Required

Say 🤦

• Now, let's share the resume with the fellow participant sit^{ting}next to you and evaluate each other's effort.

Do 🗸

- Congratulate each participant for making their first attempt towards creating an effective resume.
- As a follow upactivity, you can suggest them to prepare their own resume and show it to you the next day.

- Summarize

- Close the discussion by showing some effective resume samples to the candidates.
- Ask the participants what they have learnt from this activity.
- Ask if they have any questions related to what they have talked about so far.

Notes for Facilitation

- Keep printed copies of the activity ready for the session.
- Put down the suggested format of the resume on the board while explaining the steps in preparing a resume.
- Do check the participants' resume and suggest necessary changes.
- Suggested example for the case presented:

Nipesh Singla

#1XX7, Sector XX-D

Chandigarh-160018

Mobile No: 91-988XXXXX01

E-mail: nxxxxxxxla@gmail.com

Objective: Seeking an opportunity to use my interpersonal skills and experience to contribute to your company's growth, profitability and objectives.

Professional strengths:

- Proficient in housekeeping
- Experienced in and capable of working with a diverse work force
- Team player and friendly in nature
- Successful working in a multi-cultural environment
- Detail oriented, flexible, and adaptable
- Knowledge of Microsoft Word, Excel, Access and PowerPoint

Educational background

- Diploma in Hotel Management and Catering, Westwood School of Hotel Management, Zirakpur
- High School, Government Boys Senior Secondary School, Sector 15, Chandigarh

Professional internships:

- Housekeeping Intern, XYZ Group of Hotels, New Delhi (June 2010 August 2010)
 - Responsible for cleanliness and maintenance of one floor in the hotel.
 - Got opportunities to make housekeeping arrangements for corporate meetings.

Volunteer Work:

• Student volunteer at children's hospital in

Chandigarh. Nipesh Singla

UNIT 9.4.3: Interview FAQs

Unit Objective @

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

- Discuss the most frequently asked intervie^{w questions}
- Discuss how to answer the most frequently asked interview questions

Resources to be Used

Participant Handbook

Say

- Tell the participants you will provide them with interview situation and ques tions and they have to try to answer them.
- Tell them you will also explain the different ways to approach these questions.

Do

- Divide the class in pairs and ask the participants to perform a role play.
- One partner will play the role of the interviewer while the other will play the role of the interviewee.
- Tell them the interviewer can start the interview by asking the interviewee to introduce himself/herself.
- Call all the pairs one by one in front of the class to enact the role play.
- Follow the same pattern for all other situations.
- Time allotted for each situation is 8-10 minutes.
- Congratulate each participant for giving their input.
- Ask the class to applaud each time a team has completed their role play.
- Keep a check on time.

Role Play

Conduct a role play for the situation given.

Situation 1

- The interviewer will start by asking the interviewee a few generic questions such as:

 What is your name?
 - Tell me something about yourself?
 - Can you tell me something about your family?

- Then, the interviewer will bluntly ask the following questions:
 - How do you explain this hug^{e time} gap in your resume?
 - What is the reason for this?
 - Weren't you looking for a job or is it that no one selected you?

Say 痛

De-brief:

- When you put information on your resume, you should be prepared to answer any
 questions about it.
- Be present and focused on the questions being asked to you.
- One way of tackling the blunt questions is to tell the interviewer you did n ot come across an opportunity where you were sufficiently sa tisfied with both the remuneration offered as well as the profile. Therefore, you waited for the right opportunity to come along while looking for an ideal job.

Role Play

Conduct a role play for the situation given.

Role Play – Situation 2

- The interviewer will start by asking the interviewee a few generic questions such as:
 O What is your name?
 - Tell me something about yourself?
 - Can you tell me something about your family?
- Then, at the end of the interview, ask the interviewee:
 - There are over 200 people who have applied for this job, some with excellent work experience. Why should I hire you?

Sav ब

De-brief:

- There is nothing wrong with stating your strengths and achievements. However, do not come across as arrogant or too boastful.
- You need show the interviewee that you have unique skills or talents to contribute to the company. The interviewer needs to know how you stand apart from the rest of the crowd.
- Tell the interviewer you are looking for ward to working with the company and that you are a hard-working individual.

- Role Play 🗐

Conduct a role play for the situation given.

Role Play – Situation 3

- The interviewer will start by asking the interviewee a few generic questions such as:
 O What is your name?
 - o Tell me something about yourself?
 - Can you tell me something about your family?
- Then, lean forward, clasp your hands on the table and in a soft voice ask the interviewee:
 - Did you ever experience any neglect or disregard from your previous office? In other words, did you ever suffer because your office or team displayed favouritism?



De-brief:

- Keep this in mind: Do not criticize anyone during an interview.
- You are free to express your opinion, however, your language, answers, body language, and the tone of your voice should remain constructive and neutral.
- Since criticism will show you in negative light, you should keep your answers honest yet diplomatic.
- You can tackle such questions by saying, "I got along well with most of my faculty and peers."



Conduct a role play for the situation given.

Role Play – Situation 4

- The interviewer will start by asking the interviewee a few generic questions such as:

 What is your name?
 - Tell me something about yourself?
 - Can you tell me something about your family?
- Then very bluntly ask the interviewee:
 - How long do you plan to stay with this company if you are selected?
- After the candidate responds, ask sarcasti

cally: \circ Do you seriously mean that?

Say 1

De-brief:

- Don't provide unreal and idealistic answers.
- Your answers should be honest yet diplomatic. In a situation like this, the interviewer does
 not expect you to provide a specific timeline.

 You can say something like, "I would like to stay with the company as long as I can contribute constructively and develop as an employee, within the organization, professionally and financially."

- Role Play 🝯

Conduct a role play for the situation given.

Role Play – Situation 5

- The interviewer will start by asking the interviewee a few generic questions such as:

 What is your name?
 - Tell me something about yourself?
 - Can you tell me something about your family?
- Ask him/her how important he/she thinks it is to be punctual in the corporate world.
- Afterhe/she answers, look up sternly at the interviewee and in a crisp voice, say:
 - You were late for this interview by 10 minutes. That surely does not seem to be in line with what you just said?

Say 🗣

De-brief:

- Politely apologize for being late.
- You can add something such as, "I assure you this is not a habit". All your future actions should be in line with this statement.
- Avoid giving any excuses.
- You might feel obligated to provide a jus tification for your tardiness, but the interviewer is not interested in that.
- Do not over apologize. Once this response is out of the way, turn your focus back to the interview.

– Role Play ≶

Conduct a role play for the situation given.

Role Play – Situation 6

- The interviewer will start by asking the interviewee a few generic questions such as:

 What is your name?
 - Tell me something about yourself?
 - Can you tell me something about your family?
- After asking a few academic or job-related questions, ask the interviewee: \circ

If you get this job, what salary package do you expect us to give you?

Say 痛

De-brief:

 If there is no way for you to avoid this question, respond to the interviewer by providing a reasonable and well-thought out salary range.

Role Play

Conduct a role play for the situation given. Role Play – Situation 7

- The interviewer will start by asking the interviewee a few generic questions such as:

 What is your name?
 - Tell me something about yourself?
 - Can you tell me something about your family?
- Then, bringing the interview to a close, ask the interviewee:
 - Do you have any questions for me?

Say

De-brief:

- Ask relevant questions.
- Don't bombard the interviewer with questions.
- If you have questions about the result of the interview, you can limit your questions to 1
 - or 2. Keep them short and relevant like:
 - \circ When will I be informed about the results of the interview?
 - What are the working hours?
 - Will the job require me to travel?

Explain

- Tell the participants to be prepared for answering different types of questions in an interview.
- Stay calm and focused, and take a moment to think about how you should respond. Always maintain a confident tone.
- Even if you don't intend to, your body language conveys your level of discomfort with a
 particular question.
- Try to keep your actions, tone, and gestures neutral.
- Maintain your composure while answering personal question.

Do

- Tell all the participants to form pairs again.
- Tell them to use the following list of frequently asked interview ques tions to conduct mock interviews.

- They will use all or some of these questions to conduct mock interviews with their partners.
- One partner will play the role of the interviewer while the other will play the role of the interviewee.
- After they are through asking and answering the questions, the roles will be reversed.
- The same list of questions will be used again.
- After each mock interview ask the interviewer to provide feedback and clear any doubts that may arise.
- Time allotted for each situation is 30-35 minutes.



Mock Interview Questions

Mock Interview Questions

Tell me something about your family.

What qualities would you look for in a Manager or a Supervisor?

Why did you apply for this job?

What do you know about this company?

How do you deal with criticism?

How do you plan to strike a good work-life balance?

Where do you see yourself five years from now?

Have you applied for jobs in other companies?

What kind of salary do you expect from this job?

Do you have any questions for me?

Summarize



- Close the discussion by discussing the questions in the both activities.
- Ask the participants what they have learned from this activity.
- Ask if they have any questions related to what they have talked about so far.

UNIT 9.4.4: Work Readiness – Terms and Terminology

Unit Objective 🮯

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

Identify basic workplace terminology

Resources to be Used 🧬

- Participant Handbook
- Chart papers
- Blank sheets of paper
- Pens

Ask 🖳

- What do you understand by workplace terminology?
- Are offer letter and contract of employment the same?

- Say 뎗

• Let's start this unit with an activity.

- Team Activity 😫

Workplace terminology

• This is a group^{activity}conducted in three parts.

Part 1

Sheila received a call from the recruiter of MND Company. Before she is recruited by the company, think of the recruitment process she will have to go through. Start from the telephone call to signing her letter of acceptance. Write down all the words that come to your mind.

Activity De_brief

- Have the participants read out the words they have written
- Encourage all the participants to participate in the activity

Do

- Divide the class into small groups of 4 or 6.
- Instruct the participants that they will be doing a brainstorming activity.
- Give them one chart paper each. Tell them to divide the chart in two parts.
- Instruct them that they have to use one half of the chart paper now. The other half will be used later.
- The participants have to write all the words that come to their mind related to the recruitment process.
- Give them 10 minutes to do the activity.
- Tell them that there are no right or wrong answers.
- Keep a track of the time.



- You all know quite a few words related to the terms used in the office.
- Let us talk about some new terms that have been missed out.
- Discuss "Work Readiness Terms and Terminology" with the participants as given in the participant Handbook.

Ask 🖳

- Why is it important to know the workplace terms?
- How do they help?
- Can the words be categorised further?

Say 💁

Let's now continue theactivity.

eam Activity 🙀

Terms and Terminology

• This is again a groupactivity. The members of the group remain the same as in Activity 1.

Part 2

• With the help of the new terms you have learned, make a flow chart of the hiring process of MND Company.

Activity De-brief

• Ask the groups to share the flow charts and the new terms they added while preparing the flow chart.

Do 🔽

- Instruct the participants that they have to use the 2nd half of the same chart they had used before.
- Using the new terminology and the terms they had previously written on the chart, they have to make a flow chart of the hiring process of the MND Company.
- Give them 10 minutes for this activity.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Say G

Let's go ahead with the activity.

eam Activity 🙀

Terms and Terminology

The activity continues with the same group members.

Part 3

Sheila now works for the MND Company. She is not aware of the company culture and policies. She goes to the HR Department to get her doubts clarified. Can you think of the terms for which she wants clarity? Make a list of those words.

Activity De_brief

 Ask the groups to share their list of words. Some of the words are benefits, comp. time, deduction, employee training, holidays, lay-off, leave, maternity leave, mentor, notice, paternity leave, and time sheet.

Do

- Instruct the participants to identify the key terms an employee of a company should know. They can use the same chart paper for this activity.
- Give them 5 minutes for this activity.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Summarize

Note: You can either summarize the key points of the unit or have a role play where an employee has just joined a company and the HR Manager explains the terms of employment.

UNIT 9.5: Understanding Entrepreneurship

Key Learning Outcomes

At the end of this unit, participants 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

UNIT 9

Entrepreneur

Unit Objectives

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

- Discuss how to iden tify new business opportunities
- Discuss how to identify business opportunities within their business

Resources to be Used

- Participant Handbook
- Blank sheets of paper
- Pens

Ask 🤄

- How does an entrepreneur iden^{tify} an opportunity?
- What do you think are the common queries or concerns faced by entrepreneurs?
- How can you iden tify new business opportunity?

Say 🔽

- Let's talk about opportunity, common queries or concerns faced by entrepreneurs, idea as an opportunity, factors to consider when lookin g for opportunities, ways to identify new business, and opportunity analysis as discussed in Participant Handbook.
- Let's do an activity to understand ways to identify business opportunities within your business.

Do

- Tell the class that this is an individual activity.
- Tell the participants to create a matrix on their notebooks.
- There will be four boxes in your matrix.
- Strength, Weakness, Opportunity and Threats will be the four headings of the matrix. This is called the SWOT matrix.
- Read out the questions to them and tell the participants they need to answer the guestions asked in each matrix.
- Tell them they can also use their own understanding of themselves to fill the SWOT matrix.

Activity	Ð	
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Do your SWOT analysis

Strength	Weakness
What are your strengths?	What are your weaknesses?
What unique c ^{apabilities} do you possess?	What do your competitors do better
What do you do better than others?	than you?
What do others perceive as your strengths?	
Opportunity	Threat
What trends may positi vely impact you?	Do you have solid financial support?
What opport unities are available to you?	What trends may negatively impact you?

Do

- Congratulate everyone for the class activity.
- Ask the audience to applaud for themselves.
- Allot the participants sufficient time to complete this activity, but do keep a check on time.
- Ask de-brief questions to cull out information from the participants.

Ask 🖭

De-brief questions:

- What are your weaknesses according to your SWOT analysis?
- Do you think you can change your weakness into strength? How?
- Do you think you can work on your threats? How?

Summarize 🖉

- Close the discussion by summarizing ways to identify business opportunities within your business.
- Ask the participants what they have learned from this exercise.
- Ask if they have any questions related to what they have talked about so far.

UNIT 9.5.6: Entrepreneurship Support Eco-System

Unit Objectives 🔘

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

- Explain the meaning of entrepreneur
- Describe the different types of entrepreneurs
- List the characteristics of entrepreneurs
- Recall entrepreneur success stories
- Discuss the entrepreneurial process
- Describe the entrepreneurship ecosystem
- Discuss the purpose of the 'Make in India' campaign
- Discuss the key schemes to promote entrepreneurs

Resources to be Used

- Participant Handbook
- Chart papers
- Marker pens
- Pencils
- Colour pencils
- Scale
- Eraser
- Other requisite stationery material

Ask 🤄

- Do you think that entrepreneurs need support?
- What do you think is an eco-system?
- What do you think 'entrepreneurship support eco-system' means?

Say 🗣

- Let's learn what entrepreneurship support eco-system means.
- Discuss 'Entrepreneurship Support Eco-System' as given in the Participant Handbook

Ask 🥯

- Can you define entrepreneurship support eco-system?
- What are the key domains of the support eco-system?

Say 痛

- Let's learn more about these domains by conducting an activity.
- You have to make a poster showing the components of the six main domains of entrepreneurship support eco-system.

eam Activity

• Making a poster showing the entrepreneurship support eco-system.

Do

- Divide the class into groups of four or six.
- Hand out chart paper and coloured pens.
- Explain the purpose and dura tion of the activity.
- Go around checking the progress of each group.
- Set guidelines pertaining to discipline and expected tasks.

Activity De-brief

Ask each group to display their poster and explain the key domains of entrepreneurship support eco-system.



Fig 8.5.2: Key domains of entrepreneurship support eco-system

- Ask 🖳

Sav

• What kind of government support eco-system is available for entrepreneurs in India?

• Discuss 'Make in India' campaign as given in the Participant Handbook.

eam Activity 🙀

Presentation on key schemes to promote entrepreneurs

Do

- Divide the class into pairs.
- Number each pair from 1-15.
- Assign a scheme, same as their group number, to each group.
- Ask them to read the scheme carefully and present it to the class.
- Explain the purpose and duration of the activity.
- Go around checking the progress of each group.
- Set guidelines pertaining to discipline and expected tasks.

Activity De-brief

• Ask each group to explain the scheme offered by government to promote entrepreneurs.

Summarize 🖉

• Summarize the unit by discussing the key points and answering questions the participants may have.

UNIT 9.5.7: Risk Appellite & Resilience

ctive

Unit Objectives 6

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

- Discuss the relationship between entrepreneurship and risk appetite
- Discuss the relationship between entrepreneurship and resilience
- Describe the characteristics of a resilient entrepreneur

Resources to be Used

- Participant Handbook
- Chart papers
- Blank sheets of paper
- Pens
- Marker pens

Ask 🖳

- Can you define risk or explain what constitutes a risk?
- What do you people mean when they say, "This may be a risky proposition"?
- What risks are they talking about?

Example

• Let's have a look at these two examples:

Rohit and his family were travelling by car from Delhi to Nainital. It was their second trip there. Rohit was familiar with the road. His friends told him that the highway after Rampur was in a bad condition. They advised him to take a shortcut and turn left from Moradabad and take the Kaladhungi road. This road is in a better condition.

Since he was going with his family, and did want to take the risk of g^{etting lost}, he le ft early. He took the Kaladhungi road and reached Nainital well in time.

Suresh and his family too were travelling by car from Delhi to Nainital. It was their second trip there. His friends too advised him to take a shortcut and turn left from Mo radabad and take the Kaladhungi road as this road was in a better condition.

Suresh too decided to take the Kaladhungi road but he left Delhi in the afternoon. It was dark by the time he reached Kaladhungi, and he was sure that he was taking the correct turn. As it

was late, he could not find anyone to give him directions. He ended up being in an unknown place that was scarcely inhabited.

Say

- Let's see what type of risks Rohit and Suresh took.
- Discuss 'Risk Appetite and Resilience' with the participants as given in the Participant Handbook.

Say 痛

• Let's learn more about risk appetite and resilience with the help of anactivity.

eam Activity

Risk Appetite

- This is a groupactivity.
- In the previous unit, you read success stories of Mr Dhirubhai Ambani and Dr Karsanbhai Patel.
- Mr Ambani left his job and started his company Reliance with just Rs. 50,000/__
- Dr Patel kept his job, went door -to-door to sell Nirma, and only when the brand started gaining popularity did he start his own company.
- What types of risk did both of them take?
- What risk factors, do you think, did they keep in mind before launching their company?
- Write the Risk Appe^{tite} Statement of both the companies.

Activity De-brief

- Who took a greater risk?
- What are the differences between the Risk Appe^{tite} Statement of both the companies?

Do

- Instruct the participants that this is group work.
- Divide the class into small groups of 4.
- Give each group a chart paper.
- Tell the participants that they have to evaluate the risks taken by Mr D hirubhai Ambani and Dr Karsanbhai Patel.
- Give the participants 15 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Ask 🥌

- Do you think all entrepreneurial ventures are successful?
- What happens if the first venture is not successful?

Should the entrepreneur stop when faced with challenges or face them?

Example

• Let's have a look at the following example:

Vijay Shekhar Sharma is the founder of Paytm, which is a giant Indian e-commerce. He was born in a middle-class family in **Uttar Pradesh**. He started his first job at an MNC. He quit after six months and built a company One97 with his friends. As One97 grew bigger, it needed more money because it was running more servers, bigger teams, and had to pay royalty. At that time, the tech bubble popped and technology companies were running in losses. Finally, money ran out. So One97 took loans and then more loans at higher rates of interest, as high as 24 per cent, and became caught in a vicious cycle. In 2014, Paytm was launched with online wallet services a fter which, the company enabled

online payment transactions. The company Bot licenses from RBI in 2016 to launch India's first ever payment bank. Moreover, the main motive of Paytm was to transform India into a cashless economy.

After demonetization came into effect, Vijay Shekhar Sharma started promoting online and digital transactions to deal with the cash crunch. In fact, the service of the company's mobile wallet is accepted across India. The logo of Paytm is now popular almost everywhere from tea stalls to major companies.

Say 🗟

- Let's see what qualities made Vijay Shekhar Sharma a resilient entrepreneur.
- Discuss Entrepreneurship and Resilience with the participants as given in the Participant Handbook.

Say 9

Let's learn more about entrepreneurship and resilience with the help of an activity.

Team Activity 🙀

Entrepreneurship and Resilience

- This is a groupactivity.
- Think of some entrepreneurship ventures that f aced challenging times, but later resulted in success stories.
- Who is the founder of that company?
- What challenging times did it face?
- How did it overcome those challenges?
- List the resilient characteristics of the entrepreneur.

Activity De-brief

- Each group to give their presentation.
- Why did you choose this company?
- What is the success story of the company?

Do 🗸

- Instruct the participants that this is group work.
- Divide the class into small groups of 4.
- Give each group a chart paper.
- Tell the participants that they have to think of an entrepreneur who faced challenging times, but eventually succeeded.
- Give the participants 15 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Summarize 🖉

- You can summarize the key points of the unit.
- Ask the participants what they learned from the activities.
- Clarify any questions or doubts they might have.

UNIT 9.5.8: Success and Failures

Unit Objectives 🔘

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

Discuss how to deal with failure

Resources to be Used 💣

Participant Handbook

Ask 🖳

- Have you heard the quote 'nothing is impossible'?
- What do you think it means?
- Do you think that all successful entrepreneurs became famous overnight or did they have to struggle or face failure before succeeding?

Example 🕅

Let's have a look at this example.

Shah Rukh Khan, also known as, SRK or King Khan is a force to reckon with. Did he achieve stardom overnight?

Shah Rukh Khan, who has seen many struggles in his life – he has slept on streets, struggled to support himself and his sister at a very young age, and lost his parents very early in life, which led to his sister seeking mental health support. Amidst all the chaos and challenges, he kept pushing himself, and today he stan ds tall as the 'Badshah of Bollywood'. Certainly, those years were not easy for him.

When he was young, he stood at Marine Drive and said, "I will rule this city one day". Failure was not just his companion during or before his stardom, it is still a substantial part of his life. Success does not come easy. What made him a star was his acceptance of failure and the urge to improve.

Say 痛

- How do you define success and failure?
- What is fear?
- Discuss "success and failure" with the participants as given in the Participant Handbook.

Ask 🖳

- Have you felt or experienced fear?
- What led you to feel that emotion?
- How did you handle it?

Say 🞑

• Let's learn the about success and failure with the help of an activity.

Team Activity 🛃

- Divide the class into groups of four.
- Instruct them to think of one scenario where they have to interview a successful entrepreneur.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- They have to choose one person from the group as the interviewee and one as the interviewer.
- Go around and make sure they have understood what is to be done and are discussing the roles properly.
- Check that everyone understands their role. Give clarifications if needed. Give the
 participants about 5 minutes to discuss and decide their roles.
- Ask the groups to stop the discussion as soon as the time is over.
- Invite each group one by one to come and present their interview as a role play.

Notes for Facilitation

Facilitating Role Plays

Preparing for the activity

- 1. Carefully review the details of the scenario and the character descriptions.
- 2. Become familiar with the key issues being addressed in the scenario.
- Study the provided material so that you are ready to address issues related to the situa tions depicted in the role plays.
- Anticipate potential questions that might be raised by theparticipants and be ready to address them.

Conducting the activity

- Introduce the activity. Emphasize that role playing provides participants with an opportunity to apply their new knowledge, skills, and tools in situations that simulate actual interactions with customers.
- Ask participants to form pairs. Direct the members of each group to choose who will play the roles. Remind the groups that each participant should be given the opportunity to play/practice the different roles.

- Conduct a demonstration so that participants become familiar with the expectations related to the roles and support materials.
- 4. To maintain spontaneity of the interac^{tions} during the role pla_y, ask the participants not to discuss the details of their roles prior to the role play.
- 5. Give the pairs 15-20 minutes to conduct the role play.
- Circulate among the groups to answer any ques tions that may arise and provide guidance as needed.
- 7. After all the pairs have finished with the role play, conduct a de -briefing session on each role play.
- Ask the groups to take five minutes to talk about what happened during the role play. The groups should discuss the questions given in the de-briefing for each role play. Encourage participants to provide constructive criticism during their discussions.
- Conclude the activity by askingparticipants to think about whether and how they might use scripted role plays in their real life.



Wrap the unit up after summarizing the key points and answering questions.

UNIT 9.6: Preparing to be an

Entrepreneur Key Learning Outcomes

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

- 1. Discuss how market research is carried out
- 2. Describe the 4 Ps of mark eting
- 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 their own enterprise
- 16. List the importan

t questions that every entrepreneur should ask before starting an enterprise

UNIT 9.6.1: Market Study/ The 4Ps of Market Importance of an IDEA: Understanding Market Research

Unit Objectives

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

- Discuss how market research is carried out
- Describe the 4 Ps of mark eting
- Discuss the importance of idea generation

Resources to be Used

- Participant Handbook
- Chart papers
- Markers pens
- Blank sheets of paper

Ask 🦳

- Suppose, you want to open a restaurant, what are the factors you will consider?
- How will you promote your restaurant?

Example

• Let's have a look at this example.

Arjun was an MBA working in a company. But he wanted to start a low cost budget hostel for foreign tourists coming to India. He did a lot or market research before starting the project. Based on the information he gathered, he made his business plan. His hostel is now flourishing and he is thinking of expanding to other tourist destinations.

Say 🔎

- Discuss "Market Study" with the participants. Refer to the Participant Handbook.
- Let's learn about market study and research with the help of an activity.

Team Activity 🙀

Market Study

- This is a group activity.
- You want to start your own tuition centre.
- What type of research will you do?

Activity De_brief

- Ask each group to come forward and give a brief presentation.
- Encourage other groups to be interactive and ask questions.
- What factors did you keep in mind while doing your research?
- Based on our research would you go ahead and open a tuition centre?

Do

- Instruct the participants that this is group work.
- Divide the class into small groups of 4 or 6.
- Give each group a chart paper.
- Tell the participants that they have to start their own tuition cent re.
- Give the participants 10 minutes to discuss and write the research work they need to do.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Sav 🗟

By opening a tuition centre you are offering a service.

Ask 🖳

What factors will you keep in mind before opening it?

Say 🚘

Discuss "The 4Ps of Marke ting" with the participants as given in the Participant Handbook.

Say G

Let's learn about the 4Ps of Mark^{eting} with the helpof an activity.

Team Activity 🙀

4 Ps of Marketing

- This is a group activity.
- You have to sell a pen to four different segments:
 - 1. Rural villagers
 - 2. Rural middle class
 - 3. Urban middle class
 - 4. Upper end rich people (Niche market)

Keeping the 4Ps of Marke^{ting} in mind, what marketing strategy w ill you design to sell the pen?

Activity De_brief

- Ask each group to present their strategy.
- Encourage other groups to be interactive and ask questions.

Do 🔽

- Instruct the participants that this is group work.
- Divide the class into four groups.
- Give each group a chart paper.
- Assign each group a target audience for selling the pens:
 - 1. Rural villagers
 - 2. Rural middle class
 - 3. Urban middle class
 - 4. Upper end rich people
- Tell the participants that they have to design a marketing strategy keeping the 4Ps of Marketing in mind.
- Give the participants 20 minutes to discuss and come up with their strategy.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit

Activity De-brief

- Ask each group to come forward and give a brief presentation.
- Ask each group what they kept in mind while designing their marke ting strategy.
- Encourage other groups to be interactive and ask questions.

Say

- Each entrepreneur has an idea of wants he wants to sell. It may be a service or a product.
- Discuss "Importance of an IDEA" as given in the Participant Handbook.

Summarize

- Summarize the key points of the unit.
- Ask the participants what they learnt from the activities.
- Encourage them to ask if they have any doubts.

UNIT 9.6.2: Business En

Unit Objectives 🔘

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

• Recall basic business terminology

– Resources to be Used 💣

Participant Handbook



- Let's recall some basic business terminology.
- Discuss the Business Entity Concepts as given in the Participant Handbook.
- Let's learn some basic business terminology by having an activity.
- We will have a quiz today.

Activity 🏼

The ac^{tivity} is a quiz.

Do

- Divide the class in two groups and give a name to each group.
- Explain the rules of the quiz. For each correct answer the group gets 1 mark.
- If the group is unable to answer the question is passed to the next group.
- Explain the purpose and dura tion of the activity.
- Ask the guestions of the guiz.
- Keep a score of the groups.
- Set guidelines pertaining to discipline and expected tasks.

 Sı	ummarize	9		 	
•	Summarize the u	unit by discuss	ing the key points.		

 Notes for Facilitation 	
QUESTIONS FOR THE QUIZ	
1. What does B2B mean?	
Business to business	
2.	What is a financial report?
-----	---
	A comprehensive account of a business' transactions and expenses
3.	Who is a sales prospect?
	A potential customer
4.	How is working capital calculated?
	Current assets minus current liabilities
5.	What is an estimation of the overall worth of a business called?
	Valuation
6.	You are buying a house. What type of transaction is it?
	Complex transaction
7.	How will you calculate the net income?
	Revenue minus expenses
8.	How is Return on Investment expressed?
	As percentage
9.	How will you calculate the cost of goods sold?
	Cost of materials minus cost of outputs
10.	10. What is revenue?
	Total amount of income before expenses are subtracted.
11.	What is a 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.
12.	What is the formula used to calculate simple interest?
	A = P(1 + rt); R = r * 100
13.	What are the three types of business transactions?
	Simple, Complex and Ongoing Transactions
14.	The degrading value of an asset over time is known as
	Depreciation
15.	What are the two main types of capital?

Debt and Equity

UNIT 9.6.3: CRM & Networking

Unit Objectives

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

- Discuss the need for CRM
- Discuss the benefits of CRM
- Discuss the need for networking
- Discuss the benefits of networking

Resources to be Used 🜌

Participant Handbook

Ask

- Can your business run without customers/buyers?
- Who is the most important entity in any business?

Say 🤦

- The key to every success business lies on understanding the customer's expecta tions and providing excellent customer service.
- Discuss about CRM and its benefits. Refer to the Participant Handbook.
- Providing excellent customer service entails:
 - Treating your customers with respect.
 - Be available as per their need/ schedule.
 - Handling complaints effectively.
 - Building long las^{ting} rela^{tionships}.
 - Collecting regular feedback.
- Handle customer complaints proactively. Ask "what happened", "why it happened", "how can it be avoided next time", etc.
- Collecting feedback from the customers regularly will enable you to improve your good/service.
- "Let's understand it better with the help of some case scenarios. You will be given some cases within your groups. You have to analyse the case scenario that has been given to you and then find an appropriat^e solution to the problem."

Do 🖂

- Divide the class into four groups of maximum six participants depending on the batch size.
- Give one case study to each group.

- Instruct them to read the case carefully.
- The group is expected to analyse and discuss the case amongst them and find a solution to the given problem.
- Put down the discussion points (de-brief questions) on the board. Give the class 5-10 minutes to discuss the case and note down their solutions.
- At the end of 10 minutes, the team should present their case solution to the class.

Team Activity

Case Study Analysis

Raju runs a business of wooden furniture. He has a huge list of customers on Facebook and WhatsApp who give him orders regularly. Ankita is one of his old and regular customers. She placed an order for a new chester and TV cabinet via WhatsApp and requested Raju to send them as soon as possible. When the parcel reached Ankita through courier she found that chester was broken and the TV unit was chipped from the **bottom**. Ankita was heartbroken. It was a complete waste of money. She sent a message to Raju on WhatsApp, expressing her anger and disappointment. Raju might lose an old customer forever if he doesn't satisfy the customer. What should Raju do to retain his customer?

Scenario 2

Rajni runs a **boutique shop**. She sells suits and sarees. She is one of the most successful designer in her city. Rajni swears that all the clothes in her **boutique have unique designs**. Smita has to attend her cousin's wedding; she goes to Rajni's boutique to buy a saree. Smita wanted a unique designer saree. Rajni customized a saree for her and sent it over the courier. When Smita had a look at the saree she realised her two friends had the same design sarees. She sent a message to Rajni on WhatsApp, expressing her anger and disappointment. Did Rajni make a false promise? Were her designs copied? What could happen to Rajni's image after this incident? What would you do if you were in Rajni's place?

Scenario 3

Shama is a b**eautician who offers parlour services to ladies by making home visits. Recently,** Shama got her name registered on an e- commerce website. Two days earlier, she got a message from Mrs Sushma. The appointment was fixed for next day, 11:00 am and the remuner **ation for the services was decided beforehand. When Shama reached there at 10:50** am, Mrs Sushma was not at home. When Shama called her, she asked her to wait for a while. Mrs Sushma reached home at 11:45 am. Meanwhile, Shama had to reschedule her next appointment. **After availing Shama's services, Mrs Sushma refused to pay the requisite** amount and started finding faults in the services provided by her. Who was at fault in this scenario? What should you do in case the customer behaves unreasonably? What would you do if you were in Shama's place?

Scenario 4

Shailender is the manager of a car showroom. He proactively takes part in all the transactions that happen in his showroom. Vinita wants to buy a new car. She has chosen a car from Shailender's showroom. The salesperson has given her a very good discount and has also promised free service for one year. Vinita goes to the showroom and asks to complete all the f **ormalities to purchase the car. When she sees the final bill she realize that she has not** received the promised discount neither was there any mention of the free services. She immediately demands to see the Shailender. When Shailender's head asks how much discount Vinita was promised, he realised the discount will make the sale in loss. The car showroom owner might lose a customer and deal due to false commitments made by his manager. Besides, the customer might tell this to other people, creating a bad name and image for the showroom. If you owned that showroom, how would you have convinced your customer?



- Now, let's discuss the problem and solution with the class.
- The group will first briefly describe the case to the class.
- Then discuss the issue iden tified and the proposed solution.
- Present the solution as a role play.
- Post presentation, the other groups may ask questions from the group that has
 presented.

Do

- Congratulate each group for the presentation/ role play.
- Ask the audience to applaud for them.
- Keep a check on time. Tell the group to wind up the discussion quickly if they go beyond the given time limit.

Say 🤦

- If your customers are happy with you they will give referrals which will help to grow your business.
- One more way of growing business is 'Networking'.
- Discuss Networking and its benefits. Refer to the Participant Handbook.

Activity 🐉

Group Discussion

Conduct a group discussion in the class on how they can do networking for their business.

- Summarize 🔎



- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.
- Close the discussion by summarizing the importance of CRM and Networking for entrepreneurs.
- Close the discussion by summarizing the importance of CRM and Networking for entrepreneurs.

UNIT 9.6.4: Business Plan: Why Set Goals?

Unit Objectives

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

- Discuss the importance of setting goals
- Differentiate between short-term, medium-term and long-term goals
- Discuss how to write a business plan
- Explain the financial planning process
- Discuss ways to manage your risk

Resources to be Used

- Participant Handbook
- Chart papers
- Blank papers
- Marker pens
- Ruler

Ask 🖳

- Remember we had written SMART Goals in a previous session? Let's try and recall why it is important to set goals?
- While framing SMART goals, we talked about 'T' in SMART, which was 'Time Bound'? What do we mean by time bound goals?
- What time limit did you set for your goal- 3 weeks, 3 years, 10 years?

Say 💁

 Talk about short term, long term and medium-term goals, as discussed in the Participant Handbook.

Ask

• As you are planning to become an entrepreneur, you must have thought of an idea for a start-up. What is your business idea?

Do

Ask few participants to share their business ideas.

Ask 🖳

- Have you created a business plan for your business idea?
- Do you think it is important to have a business plan in place? Why/ why not?



- Talk about 'Why Create a Business Plan' as discussed in the Participant Handbook.
- Let's understand it better with the help of an activity.

eam Activity

Writing a business Plan

- This is a group activity.
- Give the groups the required resources such as chart paper and markers.
- This activity is divided into two parts:
 - 1. Create a business idea
 - 2. Develop a business plan
- The group will discuss and come up with a new business idea and present their idea to the class.
- In the second part of the activity the group will develop a business plan for the business idea.
- The business plan prepared will be presented by the groups to the class.

MY BUSINESS PLAN

Executive Summary: What is your Mission Statement?

Business Description: What is the nature of your business?

Market Analysis: What is your target market?

Organization and Management: What is your company's organizational structure?

Service or Product Line: What is the lifecycle of your product/ service?

Marketing and Sales: How will you advertise and sell your products?

Funding Request: How much fund is required and from where?

Say 🧟

- Teams will need to brainstorm for this part of the activity.
- Use the blank papers for the second part of this activity
- Make your business plan on a chart paper based on the following parameters:
 - 1. Executive Summary
 - 2. Business Description
 - 3. Market Analysis
 - Organization and Management
 - 5. Service or Product Line
 - 6. Marke^{ting} and Sales
- Explain each parameter in detail as done in the Participant Handbook.
- Discuss each parameter with the business idea examples of the groups.
- Groups will discuss and develop the business plan for their business idea.

Say 🞑

- Now, let's share our plan with the class.
- Each group will briefly describe the plan to the class.
- Post presenta tion, the other groups may ask questions to the group who have presented their plan.

- Do 🗹

- Congratulate each group for sharing their points.
- Ask the audience to applaud for them.
- Keep a check on time. Tell group to wind up the discussion quickly if they go beyond the given time limit.

Say Say

- Along with a business plan, you need to create a financial plan and evaluate the risk involved with your start up.
- Discuss 'Financial Planning' and 'Risk Management' in detail as given in the Participant Handbook.

Summarize 🔎

- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.

Notes for Facilitation

• Keep the business plan format ready in a flipchart to display it during the activity.

UNIT 9.6.5: Procedures and F

Unit Objectives

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

- Discuss the importance of setting goals
- Differentiate between short-term, medium-term and long-term goals
- Discuss how to write a business plan
- Explain the financial planning process
- Discuss ways to manage your risk

Resources to be Used

- Participant Handbook
- Bank loan/finance form sample

Ask

 While preparing a business plan in the last session, we discussed financial planning to arrange financial resources for your start -up. Therefore, how will you collect funds to start your business?

Say 🤇

- While most entrepreneurs think 'product' is the most difficult thing to decide for a business, start-up capital poses an even a bigger obstacle. Though there are various ways of funding the business, to convince investors to invest money is the most challenging.
- Some of the funding options available in India are:
 - o Bootstrapping: Also called self-financing is the easiest way of financing
 - Crowd funding: Funds are collected by consumers pre-ordering or dona^{ting} for st arting the business.
 - o Angel investors: Individual or group of investors investing in the company
 - Venture capitalists: Venture capitals are professionally managed funds who invest in companies that have huge potential. They usually invest in a business against equity.
 - o Bank loans: The most popular method in
 - India.
 o Microfinance Providers or NBFCs
 - Government programmes
- Let us know discuss the most popular method i.e. bank finance in detail here.

Do 🔽

- Discuss the list of documents that are required to apply for a loan like letter of introduction, business brochure, references of other banks, and financial statements.
- Explain the details to be filled in a loan application form.
- Divide the class into groups. Give each group a loan application form.
- Ask the groups to discuss and fill the form.

Summarize

- Close the discussion by summarizing the important documents needed for bank loan.
- Ask the
 - participants if they have any questions related to what they have talked about so far.

Notes for Facilitation

- Checklist of documents is provided as resources for the session.
- You can make some copies and distribute it during the group activity.
- Download sample loan application forms from any nationalised bank's website. Print sufficient copies to circulate it amongst the groups.

CHECKLIST OF DOCUMENTS TO BE SUBMITTED ALONG WITH LOAN APPLICATION (Common for all banks)

- 1. Audited financial statements of the business concern for the last three years
- 2. Provisional financial statements for the half year ended on _
- 3. Audited financial statements of associate concern/s for the last three years
- 4. Copy of QIS II for the previous quarter ended on _____
- 5. Operational details in Annexure I

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- 6. CMA data for the last three years, estimates for current year and prfor the next
- 7. Term loan/DPG requirements in Annexure II
- 8. List of machinery in respect of machinery offered as security in Annexure III
- 9. Additional details for export advances furnished in Annexure IV
- 10. Property statements of all directors/partners/proprietor/guarantors
- 11. Copies of ITAO of the company for the last three years
- 12. Copies of ITAOs/WTAOs of the directors/partners/proprietor and guarantors
- 13. Co pies of certificate from banks and financial institutions certifying the latest liability with
- 14. Copy of board resolution authorizing the company to apply to your bank for the credit facilities mentioned in application

15. Copy of memorandum and **article** of association (in case of limited company)/partnership deed (in case of partnership firm)

16. Cash budget for the current year and next year in case of contractors and seasonal industries.

UNIT 9.6.6: Enterprise Management – An Overview:

How to Manage Your Enterprise?

Init	Obj	ectiv	les	Ø
	-			

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

Discuss how to manage their own enterprise

Resources to be Used

Participant Handbook

Ask 🦲

ι

- Having set up a business, do you think it is possible to do everything on your own?
- Does one require trained persons for help?
- What does management mean?

Say 🧟

• Let's have a look at this example:

Kapil had a small business that was beginning to pick up pace. He wanted to expand his business, and therefore employed few more people. One day, as he was walking past Ramesh, one of his new employees, he overheard Ramesh talking rudely to a customer on the phone. This set him thinking. Kapil realised that he should have regular team mee^{tings} to motivate his employees and speak with them about any problems they might be facing during work. He should also conduct training sessions on new practices, soft skills, and technology, and develop work ethics manual for managing his enterprise.

Say

- Was Kapil correct in his approach or he should have scolded Ramesh instantly in front of his other employees?
- Discuss "Enterprise Management An Overview" with the participants as given in the participant Handbook.

Say G

Let's learn how to effectively manage an enterprise or business through anactivity.

Team Activity 🙀

Enterprise Management

- This is a group activity.
- Design a matrix listing the topics and key words that are needed to run an enterprise effectively and smoothly.

Activity De-brief

- Have each group present their matrix.
- Encourage participants of the other groups to ask question about each other's presentation.

Do

- Instruct the participants that this is group work.
- Divide the class into small groups of 4.
- Give each group a chart paper and coloured pen.
- Tell the participants that they have make a matrix they need to fill.
- They have to write the main topics and key words that will them effectively manage their enterprise.
- Give the participants 15 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

- Summarize 🔎

- Ask the participants what they have learned from this exercise/activity.
- Ask if they have any questions related to what they have talked about so far.
- Close the discussion by summarizing the importance of effective management to run an enterprise as given in the Participant Handbook.

UNIT 9.6.7: 20 Ques

efore Considering Entrepreneurship

Unit Objectives @

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

 List the important questions that every entrepreneur should ask before starting an enterprise

Resources to be Used

- Participant Handbook
- Blank sheets of paper
- Pens

Ask 🔍

Why do you want to become an entrepreneur?

Say

- It is very important to know why you want to become an entrepreneur. Your personal goals for becoming an entrepreneur play a key role in the success of your business. Your goals should be clear well before you start your business.
- Apart from the goals, the other aspects of business that you need to bear in mind are the
 poten tial problems that you may face to set_up, your areas of interest, and all the other
 dimensions of the business.
- Let's understand it better with the help of some questions that every entrepreneur should ask before starting their own business.
- Open the Participant Handbook section named '20 Questions to Ask Yourself Before Considering Entrepreneurship'. You have to answer the questions individually.
- Then, we will have a class discussion on all the questions.

Do Read out the questions one by one in front of all the participants. participants have to answer all the one by one questions. Give the class 10-15 minutes to note down their answers. At the end of 15 minutes, open the discussion for all the questions. Moderate the discussion by focusing on the relevant points.

- Keep a check ontime and don't let the discussion get sabotaged or lose track of time. Ensure all the questions are covered and discussed.
- Give the participants 15 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Summarize 🗵

- Ask the participants what they have learned from this exercise/activity.
- Ask if they have any questions related to what they have talked about so far.





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