Unit→3 Troubleshooting fundamentals —

★ **Troubleshooting :—**

→ It is the process of identifying and resolving a technical problem with in a software or computer system.

→ Troubleshooting is needed to identify the trouble and make the product operational again.

→ It enable the repair and restoration of a computer or software when it becomes faulty.

→ The goal of troubleshooting is to determine why something does not work as expected and explain how to resolve the problem.

→ Most troubleshooting begins with hardware

★ **Troubleshooting tools :—**

→ The tools which is used in troubleshooting is called troubleshooting tools.

There are various types of trouble-shooting tools :—

(I) The Bootable rescue disk
(II) Diagnostic Software
(III) Virus detection Software
(IV) Anti-Static tools

(I) Bootable rescue disk :—

→ It is a type of disc that finds threats and removes without disturbing the operating system.

→ Rescue Disk can scan
* hidden files,
* System drives,
* Master Boot Record (MBR),
* and hard drive.

→ It is also known as Recovery disc, Rescue Disk and Emergency Disk.

→ The ability to be a boot system independent of an internal hard drive is called bootable rescue disc.

→ The rescue disk contains malware and rootkit detection, antivirus scaning, temporary file cleaners, data drives backup, partition and even password crackers.

(II) Diagnostic Software :-

→ It is a software used to test a computer's hardware & ~~ensure~~ Software to ensure their performance an proper working.

→ It can be used by trained technician to identify and resolve hardware issues.

→ Different tools are presents for hardware, for better performance & repair

(I) Hardware diagnostic tool
(II) PC otimization tools
(III) Repair tools.

(III) Virus detection ~~tool~~ software

→ Virus stands for Vital Information Resources under siege.

→ It is a type of malicious software (malware) that can damage to our data, files and software through replication.

→ Malicious software is also known as malware - is a code that harm our computers and ~~hardware~~ laptops.

→ Antivirus is known as virus detection software.

→ Antivirus is a kind of software used to prevent, scan, detect and delete viruses from our computer.

→ Once installed, most antivirus software run automatically in the background to provide real-time protection against virus attacks.

(I) Norton from Symantec

(II) McAfee

(III) KASPERSKY lab

(IV) AVG Anti Virus

(V) avast be free

(VI) AVIRA

(IV) Antistatic tools :-

→ Antistatic tools are tools that improves the safety and workplace protection.

→ It is used to prevent the underirable effects of static electricity caused by mechanical friction.

Some antistatic tools are —

(I) antistatic work bench
(II) antistatic gloves
(III) ESD rubber matting
(IV) Antistatic clothing, etc.

ESD stand for electrostatic discharge mats.

★ Trouble shoting guidline :-

→ A Doubleshooting guidline is a systematic set of steps to identify, isolate and resolve problems within a system or device.

→ It is a scientific and analytical process.

→ The systematic trouble shooting approach can be divided into following steps—

- Symptom observation
- symptom analysis
- fault diagnosis
- fault rectification

Another way—

Identify the problem.
Restart or Reboot.
Review Recent changes
Consult Error Messages
Isolate the Issue
Run Diagnostic tools.
Check for malware etc.

⇨ Power system troubleshooting :—

→ check the power strip or surge protector to make sure it is plugged in and turned on

→ check for loose cables in the back of the computer (especially the main power cable).

→ Check the outlet for power problems or try moving the power cable to a different outlet.

→ Try a different cable.

⇒ Troubleshooting the System Board :—

→ The microprocessor, RAM modules, ROM BIOS and CMOS battery are typically replaceable units on the system board

→ Both the microprocessor and the ROM BIOS can be sources of such problems.

→ Troubleshooting the system board involves a systematic approach to identify and resolve issues with the motherboard. Here's a general guildline :—

(I) power Supply
(II) Visual Inspection
(III) RAM modules
(IV) CPU and cooler
(V) Pheripheral Devices
(VI) Clear CMOS
(VII) Power Supply Voltage
(VIII) Diagnostic Tools
(IX) System Beep Code
(X) Check the over-heating
(XI) Replace the motherboard. etc.

Trouble shooting guidline in OS

→ Trouble shooting guidline in OS issues:-

(I) check the updates
(II) Review Error messages
(III) Restart the system
(IV) Safe mode and check Disk space.
(V) check Task manager / Activity monitor and use system Restore
(VI) Perform a clean Boot
(VII) Reinstall Repair OS.

How to troubleshooting a hard drive:-

(I) Open file explorer and find the disk which has problem.

(II) Right click on the hard disk with errors

(III) Choose properties.

(IV) Navigate to tools bar in the Properties window.

(V) Click on the check button.

(VI) Select Scan and repair drive to start detecting & fixing disk errors.

How to troubleshooting optical drives ?

(I) Boot to the windows 10 desktop, then launch Device manager by pressing window key + X and clicking Device Manager.

(II) Expand DVD / CD-ROM drives, right-click the optical drives listed, then click uninstall.

(III) Exit Devices Manager than restart your computer.

(IV) windows 10 will detect the drive then re install it.

Troubleshooting Key board :-

→ an outdated or corrupt drives could be the reason your keyboard is not working

Troubleshooting :-

(I) check the connections :- If the keyboard is not working, check the

connections to ensure that is properly plugged in.

(II) Restart the computer :— Sometimes restarting the computer can resolve the problem.

(III) Update drivers :— check for updates to the keyboard drivers, which can be found on the manufacturer's website.

(IV) Testing the keyboard on another computer:- If the keyboard is still not working, test it on another computer to determine if the problem is with the keyboard or the computer.

(V) Replace the keyboard :— If the keyboard cannot be fixed or continues to malfunction, it may need to be replaced.

Troubleshooting monitor :—

→ Troubleshooting a monitor involves identifying and resolving issues related to display, connectivity or performance.

Here are steps to troubleshooting monitor problems :-

(a) Unplug the cable running from your computer monitor to your PC and plug it back.

(b) Verify Input Savice and test with another Device.

(c) Restart computer and monitor then check display Setting.

(d) check for physical damages.

(e) Update the video card (GPU) drives, moniter driver, chipset driver & BIOS.

Troubleshooting Pointer :-

=> Troubleshooting a pointer involves identifying and resolving issues related to pointing, connectivity or overall functionality.

Here's the guidline for troubshooting printer problems :—

(a) check to make sure the printer is turned on and connected to the same wifi network as your device.

(b) Unplug and restart your printer.

(c) Set your printer as the default printer.

(d) clean the print queue

(e) Restart the services that manages the printing queue.

★ Surge Protection and Battery Backup :—

Surge Protection :—

→ A surge Protector is a device designed to protect electronic devices from voltage spikes or surges.

→ It helps to prevent from damge to connected equipment. (approximately 200V).

→ without surge protector, any thing higher than 20V can create component issues such as

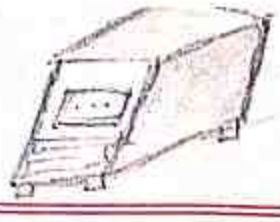
* permanent damage
* reduce life span of internal devices
* burned wires and data loss.

→ The other function of the surge protect the devices from electric surges.

Battery Backup :-

→ A device which provides power to equipment during the absence of commerical AC with the help of a battery is known as battery backup's devices.

→ UPS is the popular battery backup devices.



★ UPS ?

→ A ~~standby~~ UPS stands ~~for~~ Uninterruptible power Supply.

→ It is a device that allows computer to keep running for short time when incoming power is interrupted.

→ UPS system are commonly used for computers, servers and other critical equipment to safeguard against power disruptions.

→ ~~The~~ Small UPS provide power for a few minutes, while larger UPS have enough battery for several hours.

The main parts of a UPS are :—
rectifier, battery, inverter and controller.

There are four types of UPS :—

(I) Standby UPS
(II) Online UPS
(III) Line-interactive UPS
(IV) Intelligent UPS

Standby UPS :-

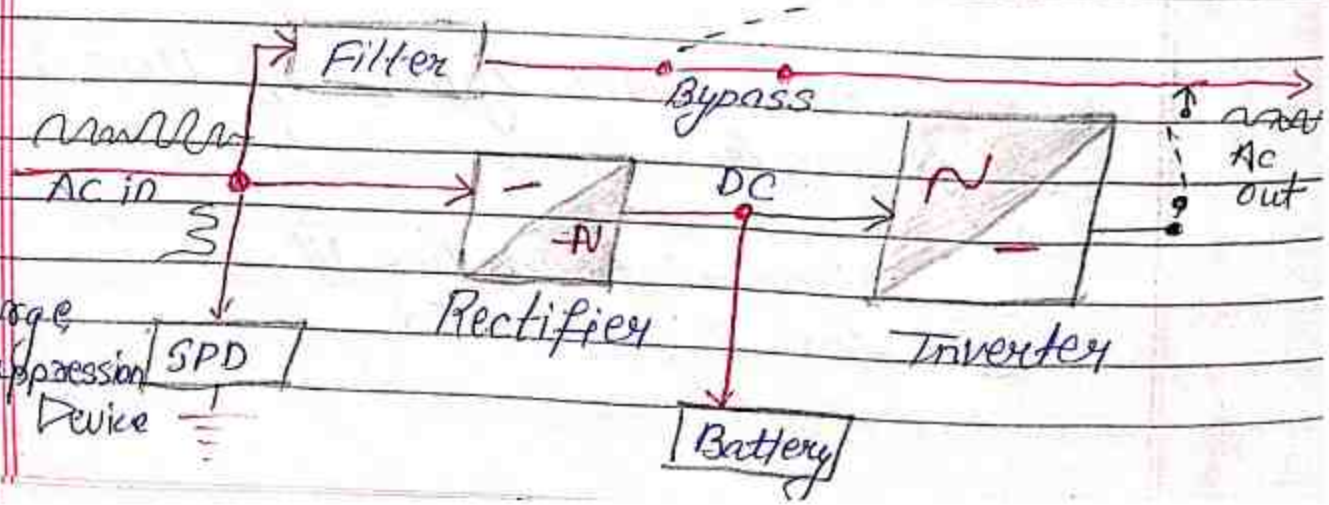
→ A standby UPS can detect an electrical failure and switch to battery power automatically.

→ The standby is also called off-line UPS.

→ when a power outage occurs the standby UPS switches to its internal battery to provide power to connected devices.

→ They provide surge protection and battery backup.

→ The protected equipment is normally connected directly to incoming utility power



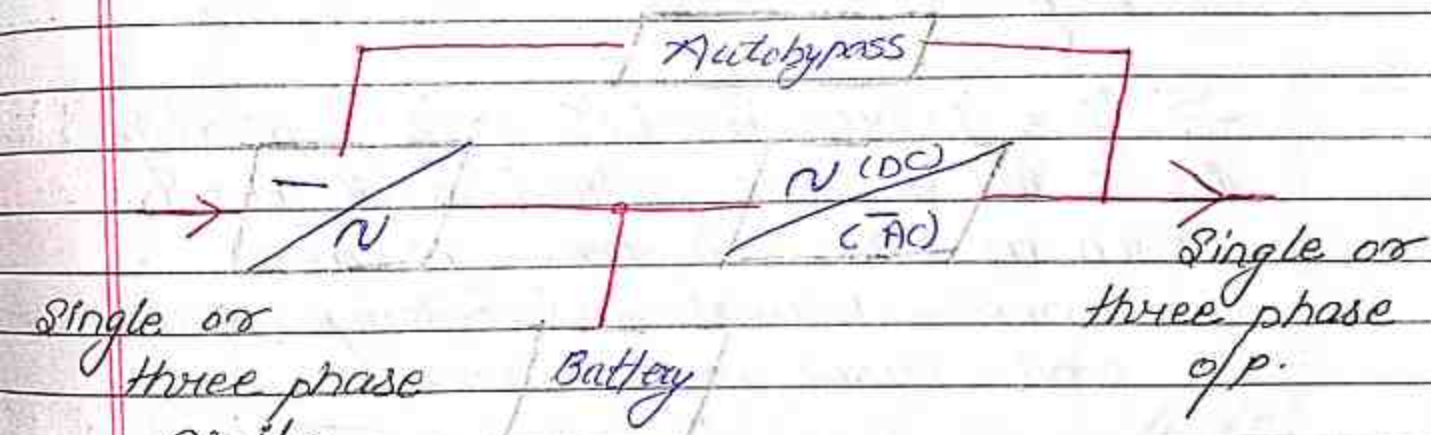
Online UPS

→ Online UPS supplies power to the AC load through the Rectifier and inverter in normal operation.

→ It uses an inverter to supply AC power during a power failure.

→ Therefore the output power supply always stay ON and there is no need for switching.

→ There is no interruption in the case of power failure even for a nanosecond.



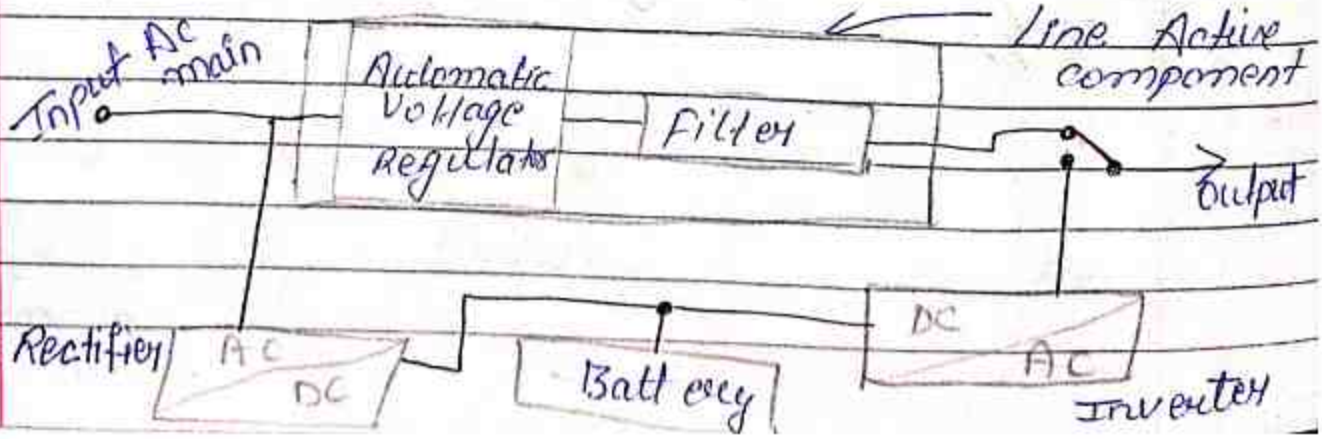
Line-interactive UPS

→ A line interactive UPS is designed to address power fluctuation more actively than a standby UPS.

→ It includes an automatic voltage regulator (AVR) that regulates the input voltage to maintain it within a specific range.

→ This helps to protect connected devices from voltage sags and surge without immediately relying on the internal battery.

→ line interactive UPS are typically used in smaller, less critical applications such as PCs, telephone system, non-critical networking equipment and small motor loads.



Intelligent UPS :-

→ An Intelligent UPS typically refers to a UPS system with advanced features and capabilities beyond basic power protection.

→ It offers green guaranteed power protection for
- computer,
- Routers,
- Modems &
- Home theater equipment.

→ Intelligent UPS also known as Smart UPS.

→ It include an LCD status panel, Automatic Voltage Regulator (AVR), energy-saving Green Power UPS Design, data line protection etc.

These UPS units often includes additional functionalities such as :-

(i) Communication Interfaces
(ii) Monitoring and management Software
(iii) Remote management
(iv) Load Management.

OSI model has 7 layer	TCP/IP model has 4 layer.
In OSI, transport layer is responsible for assurance delivery of Packets	In TCP, transport layer doesn't respon-sible for assurance delivery of Packets.
Network layer of OSI model provide both connection oriented and connectionless service.	Network layer of TCP/IP model provides only connectionless service.
In OSI model, Protocol are better covered and are easy to replace as the technology changes	In TCP/IP model Protocol can't be covered.
OSI model has been develop by ISO	It was develop by ARPANET
The smallest size of the OSI model is 5 bytes header	The smallest size of TCP/IP header is 20 bytes.