MAINTENANCE OF COMPUTER SYSTEM

LEARNING OBJECTIVES:

- Concept of printers.
- Study of printing mechanism.
- Study of dot matrix, inkjet and laser printers.
- Concept of printer controller.
- To know about interface and signals.

CHAPTER-6(PRINTERS)

6.1 INTRODUCTION

Printers are Output devices used to prepare permanent Output devices on paper. Printers can be divided into two main categories: Impact Printers: In this hammers or pins strike against a ribbon and paper to print the text. This mechanism is known as electro-mechanical mechanism.

6.2 PRINTING MECHANISM:

There are two types of printers.

6.3 Impact printers

An impact printer makes contact with the paper. It usually forms the print image by pressing an inked ribbon against the paper using a hammer or pins. Following are some examples of impact printers.

6.3.1 Dot-Matrix Printers

The dot-matrix printer uses print heads containing from 9 to 24 pins. These pins produce patterns of dots on the paper to form the individual characters. The 24 pin dot-matrix printer produces more dots that a 9 pin dot-matrix printer, which results in much better quality and clearer characters. The general rule is: the more pins, the clearer the letters on the paper. The pins strike the ribbon individually as the print mechanism moves across the entire print line in both directions, i-e, from left to right, then right to left, and so on. The user can produce a color output with a dot-matrix printer (the user will change the black ribbon with a ribbon that has color stripes). Dot-matrix printers are inexpensive and typically print at speeds of 100-600 characters per second.

6.3.2 Daisy-wheel printers

In order to get the quality of type found on typewriters, a daisy-wheel impact printer can be used. It is called daisy-wheel printer because the print mechanism looks like a daisy; at the end of each “Petal” is a fully formed character which produces solid-line print. A hammer strikes a “petal” containing a character against the ribbon, and the character prints on the paper. Its speed is slow typically 25-55 characters per second.
6.3.3 Line printers

In business where enormous amount of material are printed, the character-at-a-time printers are too slow; therefore, these users need line-at-a-time printers. Line printers, or line-at-a-time printers, use special mechanism that can print a whole line at once; they can typically print the range of 1,200 to 6,000 lines per minute. Drum, chain, and band printers are line-at-a-time printers.

6.3.4 Drum printer

A drum printer consists of a solid, cylindrical drum that has raised characters in bands on its surface. The number of print positions across the drum equals the number available on the page. This number typically ranges from 80-132 print positions. The drum rotates at a rapid speed. For each possible print position there is a print hammer located behind the paper. These hammers strike the paper, along the ink ribbon, against the proper character on the drum as it passes. One revolution of the drum is required to print each line. This means that all characters on the line are not printed at exactly the same time, but the time required to print the entire line is fast enough to call them line printers. Typical speeds of drum printers are in the range of 300 to 2000 lines per minute.

6.3.5 Chain printers

A chain printer uses a chain of print characters wrapped around two pulleys. Like the drum printer, there is one hammer for each print position. Circuitry inside the printer detects when the correct character appears at the desired print location on the page. The hammer then strikes the page, pressing the paper against a ribbon and the character located at the desired print position. An impression of the character is left on the page. The chain keeps rotating until all the required print positions on the line have filled. Then the page moves up to print the next line. Speeds of chain printers range from 400 to 2500 characters per minute.

6.3.6 Band printers

A band printer operates similar to chain printer except it uses a band instead of a chain and has fewer hammers. Band printer has a steel band divided into five sections of 48 characters each. The hammers on a band printer are mounted on a cartridge that moves across the paper to the appropriate positions. Characters are rotated into place and struck by the hammers. Font styles can easily be changed by replacing a band or chain.

6.4 Non-impact printers

Non-impact printers do not use a striking device to produce characters on the paper; and because these printers do not hammer against the paper they are much quieter. Following are some non-impacted printers.

6.4.1 Ink-jet printers

Ink-jet printers work in the same fashion as dot-matrix printers in the form images or characters with little dots. However, the dots are formed by tiny droplets of ink. Ink-jet printers form characters on paper by spraying ink from tiny nozzles through an electrical field that arranges the
charged ink particles into characters at the rate of approximately 250 characters per second. The ink is absorbed into the paper and dries instantly. Various colors of ink can also be used.

One or more nozzles in the print head emit a steady stream of ink drops. Droplets of ink are electrically charged after leaving the nozzle. The droplets are then guided to the paper by electrically charged deflecting plates [one plate has positive charge (upper plate) and the other has negative charge (lower plate)]. A nozzle for black ink may be all that’s needed to print text, but full-color printing is also possible with the addition of needed to print text, but full-color printing is also possible with the addition three extra nozzles for the cyan, magenta, and yellow primary colors. If a droplet isn’t needed for the character or image being formed, it is recycled back to its input nozzle.

Several manufacturers produce color ink-jet printer. Some of these printers come with all their color inks in a cartridge; if you want to replace on color, you must replace all the colors. Other color ink-jet printers allow you to replace ink individually. These printers are a better choice if user uses one color more than other colors. These printers produce less noise and print in better quality with greater speed.

6.4.2 Laser printers

A laser printer works like a photocopy machine. Laser printers produce images on paper by directing a laser beam at a mirror which bounces the beam onto a drum. The drum has a special coating on it to which toner (an ink powder) sticks. Using patterns of small dots, a laser beam conveys information from the computer to a positively charged drum to become neutralized. From all those areas of drum which become neutralized, the toner detaches. As the paper rolls by the drum, the toner is transferred to the paper printing the letters or other graphics on the paper. A hot roller bonds the toner to the paper.

Laser printers use buffers that store an entire page at a time. When a whole page is loaded, it will be printed. The speed of laser printers is high and they print quietly without producing much noise. Many home-use laser printers can print eight pages per minute, but faster and print approximately 21,000 lines per minute, or 437 pages per minute if each page contains 48 lines. When high speed laser printers were introduced they were expensive. Developments in the last few years have provided relatively low-cost laser printers for use in small businesses.

6.4.2.1 Advantages of Laser Printer

- The main advantage of Laser printer is its speed & efficiency at which it prints high-quality graphics & text.
- Laser printers produce high-quality output as compared to other printers.
- Laser printers are quite and does not produce disturbing sounds.
- They are also capable to produce color prints.

6.4.2.2. Disadvantages of Laser Printer

- The main disadvantage of Laser printer is its cost, they are relatively costly as compared to other printers.
• The maintenance, repair & servicing charges are also high of these printers.
• Laser printers emit small amount of ozone and are hazardous to health and the atmosphere.
• 6.5 PRINTER CONTROLLER
• In a world where our devices are becoming more mobile and less dependent on a direct connection to a PC, why should you disc printer be any different. Previously, every printer that can print on optical discs, required a direct connection to a computer to transfer the image file of the artwork. This was typically done through a USB capable and limited ones effort to allow their dupe and print operation to be more mobile. Vinpower has severed those restrictions with its new mobile standalone printer controller VPD-PRT. The new VPD-PRT can work with up to two printers allowing the artwork and operation functions to be controlled through a compact lightweight device which is extremely portable and easy to use.

Even if you’re not looking to use your printer outside of your business or home, why tie up your computer or need to purchase multiple computers just to operate your disc printer, when you can save money and time using Vinpower’s VPD-PRT. So when you’re ready to cut the ties from your printer and save money at the same time, the VPD-PRT is your best solution.

QUESTIONS:

MULTIPLE CHOICE QUESTIONS:

1) which of following is not printer:

(a) EGA
(b) mouse
(c) dot matrix
(d) laser

2) which of following is printer part:

(a) paper
(b) wires
(c) corona
(d) All of the above

SHORT ANSWER TYPES QUESTIONS:

1) What is printer?

2) BIOS stands for ............... 

3) What do you mean by colour printer?
4) What is OPC?

5) Write three types of printer.

LONG ANSWER TYPES QUESTIONS:

1) Explain in detail the construction and working of laser printer.

2) Explain in detail dot matrix printer.
MAINTENANCE OF COMPUTER SYSTEM

LEARNING OBJECTIVES:

- Concept networking devices.
- Study of networking devices.
- Concept of LAN, WAN, Wi-Fi, WLAN,
- Concept of ROUTER, SWITCH, HUB.

CHAPTER-7(NETWORKING DEVICES)

7.1. INTRODUCTION

In the networking, we use different network devices for communication purpose in the network. These network devices also work at different segments of a computer network performing different works.

7.2. Computer Network:

A computer network is a set of connected computers. Computers on a network are called nodes. The connection between computers can be done via cabling, most commonly the Ethernet cable, or wirelessly through radio waves. Connected computers can share resources, like access to the Internet, printers, file servers, and others. A network is a multipurpose connection, which allows a single computer to do more.

7.3. Types of Computer Network:

7.3.1. LAN

A local area network (LAN) is a group of computers and associated devices that share a common communications line or wireless link to a server. Typically, a LAN encompasses computers and peripherals connected to a server within a distinct geographic area such as an office or a commercial establishment. Computers and other mobile devices use a LAN connection to share resources such as a printer or network storage.

A local area network may serve as few as two or three users (for example, in a small-office network) or several hundred users in a larger office. LAN networking comprises cables, switches, routers and other components that let users connect to internal servers, websites and other LANs via wide area networks.

Nodes on a LAN
Most LANs connect workstations and personal computers. Each node (individual computer) in a LAN has its own CPU with which it executes programs, but it also is able to access data and devices anywhere on the LAN. This means that many users can share expensive devices, such as laser printers, as well as data. Users can also use the LAN to communicate with each other, by sending email or engaging in chat sessions.

LANs are capable of transmitting data at very fast rates, much faster than data can be transmitted over a telephone line; but the distances are limited and there is also a limit on the number of computers that can be attached to a single LAN.

### 7.3.2. WAN

A wide area network (WAN) is a network that exists over a large-scale geographical area. A WAN connects different smaller networks, including local area networks (LANs) and metro area networks (MANs). This ensures that computers and users in one location can communicate with computers and users in other locations. WAN implementation can be done either with the help of the public transmission system or a private network.

### 7.3.3. Wi-Fi
Wi-Fi is a type of wireless network technology used for connecting to the Internet. The frequencies wi-fi works at are 2.4Ghz or 5Ghz, ensure no interference with cellphones, broadcast radio, TV antenna and two-way radios are encountered during transmission.

To simplify, Wi-Fi is basically just radio waves broadcast from a Wi-Fi router, a device detecting and deciphering the waves, and then sending back data to the router. It works very similarly to an AM/FM radio but it is two-way communication channel. Wi-Fi works over longer distances than bluetooth or infrared and is also a low power unobtrusive technology, making it suitable for portable devices such as laptops and palmtops. Wi-Fi is governed by the Wi-Fi Alliance, an association of manufacturers and regulators defining standards and certifying products as Wi-Fi compatible.

7.3.4. WLAN

A wireless local area network (WLAN) is a wireless distribution method for two or more devices that use high-frequency radio waves and often include an access point to the Internet. A WLAN allows users to move around the coverage area, often a home or small office, while maintaining a network connection.

A WLAN is sometimes call a local area wireless network (LAWN).

7.4. ROUTER

A router is a network device, which is responsible for routing traffic from one network to another. These two networks could be a private company network to a public network. You can think of a router as a traffic police who directs different network traffic to different directions.
7.5. SWITCH

The working of switch is similar to hub, but a switch is more intelligent than a hub. A switch does ‘filter and forwarding’ which is a more intelligent way of dealing with the data packets. When a packet is received at one of the interfaces of the switch, it filters the packet and sends only to the interface of the intended receiver. For this purpose, a switch also maintains a table called CAM (Content Addressable Memory) table and has its own system configuration and memory.

7.6. HUB

It is a networking device, which is used to connect multiple network hosts. A network hub is also used to data transfer. The data transferred in terms of packets on a computer network. When a host sends a data packet to a network hub, the hub copies the data packet to all of its ports connected to it. All the ports know about the data and the port. Thus, for whom the packet is intended, claims to it.
However, because of its working mechanism, a hub is not so secure and safe. Moreover, copying the data packets on all the interfaces or ports makes it slower and more congested which led to the use of network switch.

QUESTIONS:

MULTIPLE CHOICE QUESTIONS:

1) Which of following is types of network:

   (a) ROUTER       (b) HUB
   (c) LAN          (d) all of the above

2) Which of following is purpose of computer network:

   (a) Communication (b) Interface
   (c) Resource sharing (d) All of the above
SHORT ANSWER TYPES QUESTIONS:

1) What is Computer network?

2) Name three different types of Computer networks.

3) What is ROUTER?

4) What is SWITCH?

5) What is HUB?

LONG ANSWER TYPES QUESTIONS:

1) Difference between LAN and WAN.

2) Explain in detail Computer network.
MAINTENANCE OF COMPUTER SYSTEM

LEARNING OBJECTIVES:

- Concept of modem.
- Study of laptop.

CHAPTER-8(MODEMS)

8.1. INTRODUCTION

Modem is short for "Modulator / Demodulator." It is a hardware component that allows a computer or other device, such as a router or switch, to connect to the Internet. It converts or "modulates" an analog signal from a telephone or cable wire to a digital signal that a computer can recognize. Similarly, it converts outgoing digital data from a computer or other device to an analog signal.

The first modems were "dial-up," meaning they had to dial a phone number to connect to an ISP. These modems operated over standard analog phone lines and used the same frequencies as telephone calls, which limited their maximum data transfer rate to 56 Kbps. Dial-up modems also required full use of the local telephone line, meaning voice calls would interrupt the Internet connection.

Modern modems are typically DSL or cable modems, which are considered "broadband" devices. DSL modems operate over standard telephone lines, but use a wider frequency range. This allows for higher data transfer rates than dial-up modems and enables them to not interfere with phone calls. Cable modems send and receive data over standard cable television lines, which are typically coaxial cables. Most modern cable modems support DOCSIS (Data Over Cable Service Interface Specification), which provides an efficient way of transmitting TV, cable Internet, and digital phone signals over the same cable line.

NOTE: Since a modem converts analog signals to digital and vice versa, it may be considered an ADC or DAC. Modems are not needed for fiber optic connections because the signals are transmitted digitally from beginning to end.

8.2 NEED AND FUNCTION OF MODEMS

In addition to converting digital signals into analog signals, the modems carry out many other tasks. They minimize the errors that occur while the transmission of signals. They also have the functionality of compressing the data sent via signals. They also do the task of regulating the information sent over a network.

- Error Correction: In this process the device checks if the information they receive is undamaged. It divides the information into packets called frames. Before sending this information, it tags each of the frames with checksums. Checksum is a method of checking redundancy in the data present on the computer. The device that receives the information, verifies if the information matches with checksums, sent by the error-correcting modem. If it fails to match with the checksum, the information is sent back.

- Compressing the Data: For compressing the data, it is sent together in many bits. The bits are grouped together by the device in order to compress them.
• **Flow Control:** Different devices vary in their speed of sending signals. Thus, it creates problems in receiving the signals if either one of them is slow. In the flow control mechanism, the slower one signals the faster one to pause, by sending a 'character'. When it is ready to catch up with the faster one, a different character is sent, which in turn resumes the flow of signals.

8.3 Different Types:
Modems are classified on the basis of different criteria such as the place where they are installed, the manner in which they accept information, and the way they transmit signals. Based on these criteria, they are divided into the following types.

• **Internal and External:** The former is in the form of circuit boards, fitted in expansion slots of the motherboard. The latter is enclosed in a separate case, and not inside the system units. It is connected to the computer and the telephone line by means of two separate cables.

• **Intelligent and Standard:** The former accepts instructions entered from the keyboard of a microcomputer. The latter responds to commands and transmits information simultaneously. It is done with the help of microprocessor chips.

• **Wireless and Short-Haul:** The former transfers data by means of cables. Since they don't need an external power source, they are also called 'modern eliminators'. The latter does not require any kind of cable to transmit the data signals.

8.4 Laptop

• **Overall,** laptop and desktop computers are very similar. They have the same basic hardware, software and operating systems. The primary difference is how their components fit together. A desktop computer includes a motherboard, video card, hard drive and other components in a large case.

• **Advantages of a desktop computer,** as compared to a laptop computer: Desktop computers have more power and more features. Desktop computers are easier, and less expensive, to upgrade. Desktop computers are generally less expensiveoverall and offer a better overall value.

• **Desktop computers** have a lower risk of theft, which means less chance of losing your data and having to pay to replace your computer. **Advantages of a laptop computer,** as compared to a desktop computer: Laptop computers are highly portable and allow you to use your computer almost anywhere.

QUESTIONS:

**MULTIPLE CHOICE QUESTIONS:**

1) which of following is not modem:

(a) intelligent  
(b) mouse

(c) standard  
(d) wireless

2) which of following is not component of laptop :

(a) keyboard  
(b) camera

(c) speaker  
(d) printer
SHORT ANSWER TYPES QUESTIONS:

1) What is modem?

2) LCD stands for .................

3) What do you mean by laptop?

4) What is function of modem?

5) Write three types of modem.

LONG ANSWER TYPES QUESTIONS:

1) Explain in detail the types of modem.

2) Explain in detail laptop.