Class: 10th

Subject: Physics

Unit 17: INFORMATION AND COMMUNICATION TECHNOLOGY

Exercise MCQs:

i. In computer terminology, information means:

(a) any data

(b) raw data

(c) processed data ✅

(d) large data

ii. Which is the most suitable means of reliable continuous communication between an orbiting satellite and Earth?

(a) microwaves

(b) radiowaves ✅

(c) sound waves

(d) any light wave

iii. The basic operations performed by a computer are:

(a) arithmetic operations

(b) non-arithmetic operations

(c) logical operations

(d) both (a) and (c) ✅

iv. The brain of any computer system is:

(a) monitor

(b) memory

(c) CPU ✅

(d) control unit

v. Which of the following is not processing?

(a) arranging

(b) manipulating

(c) calculating

(d) gathering ✅

vi. From which of the following we can get information almost about everything?

(a) book

(b) teacher

(c) computer

(d) internet ✅

vii. What does the term e-mail stand for?

(a) emergency mail

(b) electronic mail ✅

(c) extra mail

(d) external mail

Important MCQs:

1. The scientific method used to store and communicate information is called:

(a) telecommunication

(b) data processing

(c) programming

(d) information technology ✅

2. The method used to communicate information to distant places instantly is called:

(a) broadcasting

(b) telecommunication ✅

(c) radio

(d) networking

3. ICT stands for:

(a) Internet Communication Technology

(b) Information Calling Technology

(c) Information and Communication Technology ✅

(d) Integrated Computer Technology

4. Flow of information means:

(a) stopping information

(b) processing only

(c) transfer of information from one place to another ✅

(d) saving the information

5. In radio and mobile phones, information is sent through:

(a) electric wires

(b) water waves

(c) electromagnetic waves ✅

(d) sound signals

6. Optical fibres carry information in the form of:

(a) electric current

(b) radio waves

(c) light signals ✅

(d) air pressure

7. A Computer-Based Information System (CBIS) includes:

(a) hardware only

(b) software only

(c) hardware, software, data, procedures, people ✅

(d) monitor and CPU only

8. Devices like floppy disks, hard disks and CDs are

used for:

(a) printing

(b) processing

(c) information storing ✅

(d) transmitting voice

9. Telephone sends sound in the form of:

(a) light

(b) waves

(c) electrical signals ✅

(d) air pressure

10. A mobile phone is a type of:

(a) satellite

(b) two-way radio ✅

(c) scanner

(d) printer

11. A fax machine is used to:

(a) copy documents

(b) edit files

(c) send documents through telephone lines ✅

(d) translate messages

12. Hardware means:

(a) instructions

(b) physical parts of computer ✅

(c) operating systems

(d) electricity supply

13. The brain of a computer is:

(a) monitor

(b) keyboard

(c) CPU ✅

(d) mouse

14. Examples of software include:

(a) CPU and RAM

(b) mouse and keyboard

(c) Windows and Linux ✅

(d) printer and scanner

15. Internet is a:

(a) telephone system

(b) TV signal provider

(c) network of computers for communication ✅

(d) wireless mouse device

16. In computer terminology, processed data is called:

(a) raw data

(b) figure

(c) file

(d) information ✅

17. The scientific method used to store and communicate data is called:

(a) hardware

(b) information technology ✅

(c) communication system

(d) electronic mail

18. The method used to communicate information to far-off places instantly is called:

(a) signal system

(b) information technology

(c) telecommunication ✅

(d) hardware transmission

19. ICT is a combination of:

(a) hardware and software

(b) programming and data

(c) information technology and telecommunication ✅

(d) internet and communication

20. The full form of ICT is:

(a) Information Control Technique

(b) Information and Communication Technology ✅

(c) International Computer Technology

(d) Internet and Communication Transmission

21. The physical components of a computer system are known as:

(a) software

(b) hardware ✅

(c) procedures

(d) data

22. Which component of CBIS contains step-by-step written instructions and rules?

(a) software

(b) people

(c) procedures ✅

(d) hardware

23. Data in CBIS is stored in:

(a) paper form

(b) machine-readable form ✅

(c) hand-written format

(d) audio cassettes

24. The success or failure of a CBIS mainly depends on:

(a) software

(b) hardware

(c) people ✅

(d) procedures

25. The flow of information refers to:

(a) data storage in computer

(b) sound waves in air

(c) transfer of information using electronic and optical devices ✅

(d) movement of files in computer

26. In telephone communication, information is sent in the form of:

(a) magnetic waves

(b) electrical signals ✅

(c) optical waves

(d) sound only

27. In cell phones, information is transmitted through:

(a) cables

(b) radiowaves ✅

(c) electric current

(d) optical fibers

28. Which waves are not refracted in the atmosphere and used in satellite communication?

(a) radiowaves

(b) light waves

(c) microwaves ✅

(d) infrared waves

29. Which of the following is not a component of a basic communication system?

(a) transmitter

(b) receiver

(c) keyboard ✅

(d) transmission channel

30. Who invented the first telephone model for transmitting voice as an electrical signal?

(a) Newton

(b) Alexander Graham Bell ✅

(c) Marconi

(d) Thomas Edison

31. In modern telephones, the mouthpiece converts voice into:

(a) radiowaves

(b) magnetic signals

(c) electrical signals ✅

(d) mechanical energy

32. A fax machine transmits text and graphics through:

(a) USB

(b) internet

(c) telephone line ✅

(d) loudspeakers

33. A cell in mobile networks refers to:

(a) SIM card chip

(b) area covered by one base station ✅

(c) mobile phone battery

(d) contact list storage

34. A modern photo phone allows users to:

(a) browse internet

(b) play games

(c) see each other's image during call ✅

(d) send emails only

35. Optical fibre is mainly used for:

(a) electrical signal transmission

(b) light signal transmission ✅

(c) magnetic storage

(d) mechanical movement

36. The main advantage of optical fibre over wires is:

(a) lower cost

(b) no electricity required

(c) high data rate over long distance ✅

(d) easy installation

37. Total internal reflection occurs in optical fibre

when:

(a) angle of incidence is less than critical angle

(b) angle of incidence is greater than critical angle ✅

(c) no light enters

(d) only red light is used

38. The thickness of each fibre in a fibre optic cable is close to:

(a) 1 cm

(b) 1 mm

(c) a human hair ✅

(d) a pencil lead

39. In multi-mode cables, data can:

(a) travel only in a single line

(b) travel through different paths ✅

(c) not travel at all

(d) travel faster than light

40. The most important part of a computer is:

(a) printer

(b) mouse

(c) CPU (Central Processing Unit) ✅

(d) screen

41. The part of the computer that performs calculations is called:

(a) monitor

(b) microprocessor ✅

(c) RAM

(d) keyboard

42. Operating system is an example of:

(a) hardware

(b) software ✅

(c) printer

(d) CPU

43. RAM is a type of memory which:

(a) stores data permanently

(b) is not used in computers

(c) clears when computer is turned off ✅

(d) only works in laptops

44. Hard disk is based on:

(a) optical technology

(b) magnetic technology ✅

(c) electrical pulses only

(d) paper recording

45. A CD stores data using:

(a) magnetism

(b) tape

(c) laser technology ✅

(d) carbon plates

46. The non-reflecting spots on a CD are called:

(a) lands

(b) waves

(c) pits ✅

(d) bumps

47. A flash drive is mainly used for:

(a) audio recording

(b) movie playing

(c) transporting and saving digital files ✅

(d) printing documents

48. Audio cassettes record sound using:

(a) plastic sheets

(b) magnetic tape ✅

(c) light reflection

(d) floppy disks

49. Data stored on floppy disks is:

(a) permanent and safe

(b) prone to loss due to magnetic fields ✅

(c) stored using lasers

(d) encrypted automatically

50. Word processing is used to:

(a) edit pictures

(b) play music

(c) write and edit documents ✅

(d) scan barcodes

51. In word processing, we can:

(a) only type documents

(b) only view documents

(c) edit, move and print documents ✅

(d) only delete text

52. The process of storing and organizing information for future use is called:

(a) data sharing

(b) data management ✅

(c) data deletion

(d) data editing

53. In super markets, barcodes are read by:

(a) computer mouse

(b) CPU

(c) optical scanners ✅

(d) keyboards

54. Internet is defined as:

(a) single computer system

(b) a wireless device

(c) a global network of networks ✅

(d) telephone service

55. The application used to view websites is called:

(a) email

(b) spreadsheet

(c) browser ✅

(d) scanner

56. Which of the following is not a web browser?

(a) Mozilla Firefox

(b) Safari

(c) MS Word ✅

(d) Opera

57. One major advantage of e-mail is:

(a) it is slow

(b) it is expensive

(c) fast and free communication ✅

(d) used only in offices

58. The illegal duplication of software and books is called:

(a) hacking

(b) piracy ✅

(c) scanning

(d) storage

59. Unauthorized access to someone's computer is called:

(a) programming

(b) e-mailing

(c) hacking ✅

(d) networking

Important Short Questions:

1. What is meant by information technology?

Answer:

The scientific method used to store, arrange, and

communicate information is called information technology.

2. What is telecommunication?

Answer:

The methods and means used to send information instantly to distant places are called telecommunication.

3. Define Information and Communication Technology (ICT).

Answer:

ICT is the scientific method of storing, processing, and transmitting information with the help of electronic equipment.

4. What is meant by the flow of information?

Answer:

The transfer of information from one place to another using electronic or optical equipment is called the flow of information.

5. What are the components of a Computer-Based

Information System (CBIS)?

Answer:

The components are: hardware, software, data, procedures, and people.

6. Name any three information storing devices.

Answer:

Audio cassettes, compact discs, hard disks.

7. How does a telephone send and receive sound?

Answer:

It converts sound into electrical signals and sends them; the receiver converts them back into sound.

8. What is the function of a mobile phone?

Answer:

A mobile phone sends and receives messages in the form of radiowaves.

9. What is hardware? Give two examples.

Answer:

Hardware includes the parts of a computer we can

see and touch, e.g., monitor and keyboard.

10. What is software?

Answer:

Software is a set of instructions installed in hardware to perform specific tasks.

11. What is meant by information in computer terminology?

Answer:

Processed data is called information.

12. Define Information Technology.

Answer:

Information Technology is the scientific method used to store, arrange, and communicate information.

13. What is Telecommunication?

Answer:

Telecommunication is the method used to transmit information to far-off places instantly.

14. What is ICT?

Answer:

ICT (Information and Communication Technology) is the scientific method to store, process, and transmit information using electronic equipment.

15. Name the five components of CBIS.

Answer:

The five components of CBIS are: Hardware, Software, Data, Procedures, and People.

16. What is meant by hardware?

Answer:

Hardware refers to the physical parts of a computer system such as CPU, input/output devices, and storage devices.

18. What is data in computer systems?

Answer:

Data are raw facts and figures used by computer programs to generate useful information.

19. What is the role of people in a CBIS?

Answer:

People operate, manage, and maintain the system and are responsible for its success or failure.

20. Why are procedures necessary in CBIS?

Answer:

Procedures are written instructions and rules for designing and using the information system properly.

21. What is meant by flow of information?

Answer:

Flow of information means the transfer of information from one place to another through electronic and optical equipment.

22. How is information transferred in telephone?

Answer:

In telephone, information is transferred through wires in the form of electrical signals.

23. How does information travel in radio and cell phone?

Answer:

In radio and cell phone, information travels through space in the form of electromagnetic waves or through optical fibres as light.

24. Name the three essential parts of a communication system.

Answer:

The three parts are: Transmitter, Transmission Channel, and Receiver.

25. What is the function of a transmitter in a communication system?

Answer:

The transmitter processes the input signal and sends it through the transmission channel.

26. What is the role of the receiver in communication?

Answer:

The receiver takes the output signal from the channel, processes it, and sends it to the transducer.

27. Who invented the first telephone and in which

year?

Answer:

Alexander Graham Bell invented the first telephone in 1876.

28. What is the purpose of a demodulator in a radio receiver?

Answer:

A demodulator extracts the information signal from the modulated radio signal.

29. How does a fax machine work?

Answer:

A fax machine scans a document, converts it into electronic signals, and sends it through telephone lines to another fax machine that prints the copy.

30. Why is the data transfer rate faster in optical fibres than in radiowaves?

Answer:

Because light waves have a much higher frequency than radiowaves, so they can carry more

information in less time.

31. What is the function of cladding in an optical fibre?

Answer:

Cladding has a lower refractive index and helps in total internal reflection of light inside the fibre.

32. What is meant by multi-mode optical fibre?

Answer:

Multi-mode fibre allows light to travel through different paths; it is thicker and used for short-distance communication.

33. What is the central processing unit (CPU) of a computer?

Answer:

CPU is the "brain" of the computer that processes instructions and performs calculations.

34. What is the role of software in a computer system?

Answer:

Software provides instructions to hardware and manages tasks like writing, calculation, and device control.

35. What is a storage device in a computer?

Answer:

A storage device is used to store information in a computer permanently or temporarily.

36. What is primary memory?

Answer:

Primary memory is the electronic memory consisting of RAM and ROM, based on integrated circuits (ICs).

37. What is the function of RAM?

Answer:

RAM is a temporary memory used while the computer is on; it loses data when the computer is turned off.

38. What is the function of ROM?

Answer:

ROM is read-only memory that starts the computer and does not lose data when power is off.

39. What is secondary storage?

Answer:

Secondary storage stores data permanently, like hard disks, audio-video cassettes, and CDs.

40. How is sound recorded on an audio cassette?

Answer:

A microphone converts sound into electric signals, which are stored on magnetic tape through a recording head.

41. What is a floppy disk?

Answer:

A floppy disk is a magnetic storage device used for short-term data storage, now outdated.

42. What is a compact disc (CD)?

Answer:

A CD is a plastic disc using laser technology to store data in the form of pits and lands.

43. How much data can a DVD store?

Answer:

A DVD can store up to 17 gigabytes of data.

44. What is a flash drive?

Answer:

A flash drive is an electronic storage device used to transport and store data using integrated circuits (ICs).

45. What is word processing?

Answer:

Word processing is a computer program through which we can write, edit, format, and print letters, articles, books, or reports.

46. Name any two features of word processing.

Answer:

- Text editing and formatting
- Inserting graphics and colors

47. What is data management?

Answer:

Data management is the process of collecting, storing, and organizing information in interlinked files for easy access and monitoring.

48. How do supermarkets use data management systems?

Answer:

They use optical scanners to read barcodes and get product details like price; this helps manage sales records and restocking.

49. What is the Internet?

Answer:

Internet is a global network of interconnected computer systems that allows communication and data sharing worldwide.

50. Name any two services provided by the Internet.

Answer:

- Web browsing
- E-mail communication

51. What is a web browser? Give two examples.

Answer:

A browser is a program used to view websites. Examples: Google Chrome, Mozilla Firefox.

52. Write two advantages of using e-mail.

Answer:

- Instant and fast communication
- Free of cost (if internet is available)

53. What is hacking in ICT?

Answer:

Hacking is the unauthorized access to computer systems, often done to steal or damage data.

54. Mention two security methods to prevent computer access by unauthorized users.

Answer:

- Using passwords or lock combinations
- Fingerprint or ID card verification

Important Long Questions:

🌟 **Q1: What is Information and Communication Technology (ICT)? Explain its definition and importance.**

❖ **Definition of ICT:**

Information and Communication Technology (ICT) is the scientific method of storing, processing, and transmitting large amounts of information in seconds using electronic equipment.

🔹 **Components of ICT:**

ICT is a combination of two major fields:

1. Information Technology:

- It is the scientific method used to store, arrange, and communicate information.

2. Telecommunication:

- It refers to the method used to communicate information instantly over long distances.

🔹 **Importance of ICT:**

- It enables fast communication across the

globe.

- Helps in managing data and information efficiently.
- Widely used in education, healthcare, business, and government.
- Plays a vital role in the modern digital world.

🌟 **Q2: Explain the major components of a Computer-Based Information System (CBIS).**

❖ **Answer:**

A Computer-Based Information System (CBIS) is made up of five essential components:

🔹 **1. Hardware:**

- Physical components of a computer system.
- Includes CPU, input/output devices, storage devices, and communication devices.

🔹 **2. Software:**

- Set of programs and instructions used by the hardware.
- Stored on disks or tapes.

- Examples: Windows, Linux, MS Word.

🔹 3. Data:

- Raw facts and figures used for processing.
- Can be in the form of text, images, numbers, or symbols.
- Stored in digital format until needed.

🔹 4. Procedures:

- Rules and instructions for using the information system.
- Documented in manuals.
- Changeable over time for flexibility.

🔹 5. People:

- Users who design, operate, and maintain the CBIS.
- They input data, write software, build hardware, and make decisions.

🌟 Q3: Differentiate between Information Technology and Telecommunication with examples.

❖ **Answer:**

Information Technology (IT) and Telecommunication are two different but related fields that together form the basis of Information and Communication Technology (ICT). Below is the detailed difference between them:

🔹 Information Technology (IT):

- IT refers to the scientific methods used to store, organize, and process information for useful purposes.
- It involves the use of computers, software, databases, and storage devices.
- Example: Using a computer to prepare a document or store data on a hard disk is part of Information Technology.

🔹 Telecommunication:

- Telecommunication refers to the methods used to transmit information instantly over long distances.
- It includes the use of electromagnetic waves,

optical fibers, telephone lines, and radio signals.

- Example: Sending a voice message through a mobile phone or sending a fax are examples of telecommunication.

🌟 **Q4: What is meant by flow of information? Explain the basic elements of a communication system with diagram.**

❖ **Definition of Flow of Information:**

Flow of information refers to the transfer of information from one place to another using different electronic and optical devices such as wires, radiowaves, or optical fibres.

Information can travel through:

- Wires as electrical signals (e.g. telephone),
- Radiowaves in space (e.g. radio, TV),
- Light signals through optical fibres (e.g. internet connections).

⚙ **Basic Elements of a Communication System:**

There are three essential parts of any

communication system:

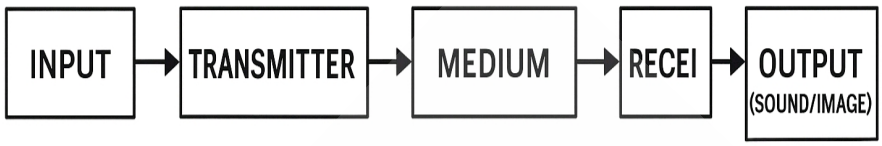


Fig. 17.2 Communication System

1. Transmitter:

- It processes the input signal (sound, image, etc.).
- Converts the information into transmittable signals.

2. Transmission Channel:

- It is the medium through which the signal travels from source to destination.

Examples:

- Pair of wires
- Coaxial cables
- Radiowaves
- Optical fibre cables

⚠ **Signal Weakening:** As the signal travels longer

distances, it loses power.

To compensate for this, signal amplifiers are used.

3. Receiver:

- It receives the signal from the transmission channel.
- Processes and amplifies it if needed.
- Delivers it to the transducer to convert it back to understandable form (sound, image, etc.).

🌟 **Q5: Describe the transmission of electrical signals through wires with the help of a telephone system.**

❖ **Answer:**

📞 **Alexander Graham Bell's Contribution:**

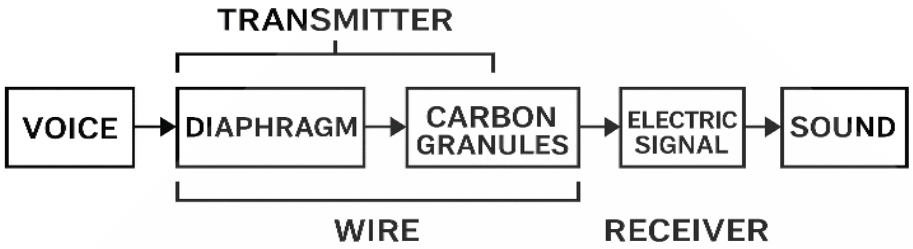
- In 1876, Alexander Graham Bell invented the first simple telephone model.
- It could convert voice into electrical signals and transmit them over wires.

🎙️ **Working of Telephone System:**

A modern telephone consists of:

- Mouthpiece (Transmitter)
- Receiver (Speaker)

Diagram:



Main Components:

1. **Diaphragm:** Thin metal sheet that vibrates when sound hits it.

2. **Carbon granules**: Adjust electrical flow based on vibration pressure.

3. **Electric coil:** Helps in signal transmission.

🔄 How it Works:

1. Speaking Side (Transmitter):

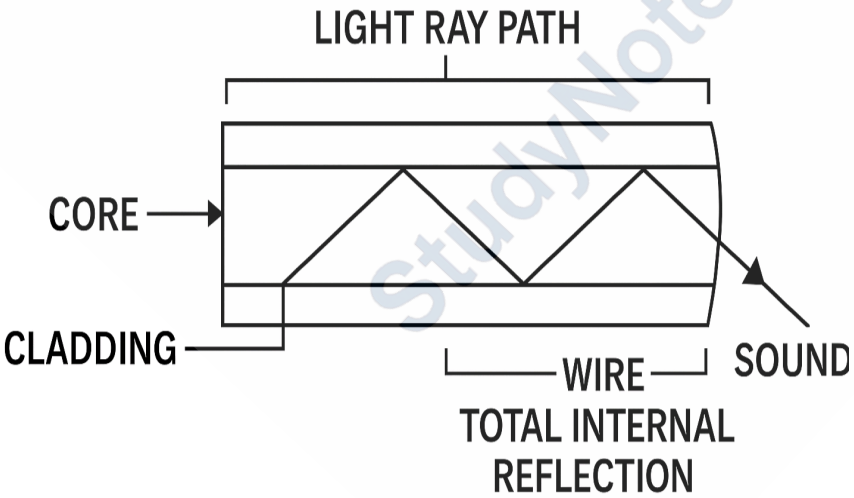
- When a person speaks into the mouthpiece:
- The diaphragm vibrates due to sound waves.
- These vibrations compress the carbon granules.

- This allows electric current to pass through the wire as electrical signal.

2. Receiving Side (Receiver):

- The electric current reaches the receiver.
- It flows through an electromagnet that creates a magnetic field.
- This attracts the diaphragm in the receiver causing it to vibrate.
- These vibrations are heard as sound.

🌟 **Q6: Explain the transmission of light signals through optical fibres.**



❖ **Definition of Optical Fibre:**

An optical fibre is a thin, flexible strand of

high-quality glass or plastic used to transmit light signals over long distances.

Structure of Optical Fibre

An optical fibre consists of:

- **Core**: Central part where light travels.
- Cladding: Outer layer with a lower refractive index; causes total internal reflection.
- **Coating**: Protective layer to prevent damage.

Working Principle: Total Internal Reflection

- When light enters the core of the fibre and hits the cladding at an angle greater than the critical angle, it reflects back into the core.
- This process continues repeatedly, allowing the light to travel long distances without escaping.

Types of Optical Fibre

1. Single-Mode Fibre:

- Very thin core.
- Light travels in a straight line.
- Used for long-distance communication.

2. Multi-Mode Fibre:

- Thicker core.
- Light travels in multiple paths.
- Used for short-distance networks.

🔹 Advantages over Wires

- Can transmit signals at very high speeds.
- Low signal loss, even over long distances.
- Immune to electromagnetic interference.
- Supports higher data rates compared to wires.

🌟 Q7: What is a computer? Describe the main components of a computer system.

❖ Definition

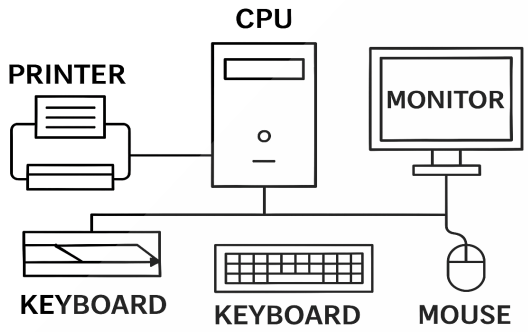
A computer is an electronic calculating machine used to perform operations like addition, subtraction, multiplication, and data processing.

🔹 Working System

- Computers work through the interaction of:
- Hardware (physical parts)

- Software (programs or instructions)

Diagram of Computer System:



Main Hardware Components

1. CPU (Central Processing Unit) – Brain of the computer.
2. Monitor – Displays output.
3. Keyboard – For data input.
4. Mouse – Used for navigation.
5. Printer – Converts digital output into hardcopy.

Importance of CPU and Microprocessor

- CPU controls and performs all processing.
- The microprocessor inside CPU executes instructions and calculations.
- Without CPU, no other part can function.

🌟 **Q8: Describe the function of the Central Processing Unit (CPU) and its importance in a computer.**

❖ **Answer:**

What is CPU?

The CPU (Central Processing Unit) is the most important hardware component of a computer.

It performs all calculations and decision-making tasks.

Components of CPU

- Contains a microprocessor chip (acts as the computer's brain).
- Executes millions of instructions per second.
- Controls input, processing, and output devices.

Functions of CPU

- Reads and executes program instructions.
- Performs arithmetic and logical operations.
- Controls all hardware components of the system.

🔹 Importance

- Without CPU, the computer cannot function.
- All software relies on CPU for execution.
- Modern CPUs perform multi-tasking and high-speed computing.

🔹 Examples of CPU Tasks

Running applications like Word, Excel, or games.

Processing images or videos.

Controlling devices like printers or USB drives.

🌟 **Q9: Compare the performance of optical fibres with electrical wires for data transmission.**

❖ **Answer:**

Here is a detailed comparison of optical fibres and electrical wires based on their performance in data transmission:

🔹 1. Type of Signal

- Optical Fibre uses light signals to transmit data.
- Electrical Wires use electrical signals for transmission.

2. Signal Frequency

- Light signals in optical fibres have much higher frequencies, especially visible or infrared light.
- Electrical wires transmit low-frequency radio waves.

3. Signal Loss

- In optical fibres, signal loss is very low, even over long distances.
- In electrical wires, signal loss increases with distance and data rate, requiring repeaters or amplifiers.

4. Data Transmission Speed

- Optical fibres provide extremely fast data transmission due to the speed of light.
- Electrical wires transmit data at a comparatively slower speed.

5. Transmission Distance

- Optical fibres can transmit data over hundreds of kilometers without much degradation.

- Electrical wires are suitable only for short to medium distances.

🔹 6. Electromagnetic Interference (EMI)

- Optical fibres are immune to electromagnetic interference.
- Electrical wires are affected by EMI, which can distort signals.

🔹 7. Security

- Optical fibre communication is more secure and difficult to tap.
- Electrical signals in wires are easier to intercept, making them less secure.

🔹 8. Use in Real Life

- Optical fibres are used in high-speed internet, telecommunications, and cable TV.
- Electrical wires are commonly used in local phone lines and household electrical systems.

🌟 **Q10: What are information storage devices? Describe their types with suitable examples.**

❖ **Definition:**

Information storage devices are electronic or magnetic devices used to store data and retrieve information for processing, saving, or transferring.

🔹 Types of Information Storage Devices:

1. Primary Memory (Main Memory):

- Directly accessed by the CPU.
- Stores data temporarily while the computer is working.
- Faster but volatile (data lost when power is off).

Examples:

- **RAM** (Random Access Memory): Temporarily stores programs/data in use.
- **ROM** (Read Only Memory): Stores permanent instructions, like BIOS.

2. Secondary Memory (Storage Devices):

- Used to store data permanently.
- Slower than primary memory, but non-volatile.

Examples:

- **Hard Disk Drive (HDD):** Stores large amounts of data permanently.
- **Compact Disc (CD):** Optical storage using laser technology.
- **Flash Drive (USB):** Portable, electronic storage with no moving parts.

🌟 **Q11: Differentiate between Primary and Secondary Memory. Write characteristics and examples.**

❖ **Answer:**

🔹 **Primary Memory:**

- Directly accessible by CPU.
- Fast and used during processing.
- Volatile (loses data when power is off).
- Limited in storage capacity.

Examples:

- RAM (Random Access Memory)
- ROM (Read Only Memory)

🔹 Secondary Memory:

- Not directly accessed by CPU.
- Used for long-term storage.
- Non-volatile (retains data after power off).
- High storage capacity.

Examples:

- Hard Disk Drive (HDD)
- Compact Disc (CD)
- Flash Drive (USB)

✅ **Key Differences:**

- **Speed**: Primary memory is faster than secondary memory.
- **Volatility**: Primary is volatile; secondary is non-volatile.
- **Usage**: Primary for running tasks; secondary for storing data permanently.

🌟 **Q12: What is a Magnetic Disk? Describe Floppy Disk and Hard Disk in detail.**

❖ Answer:

🔹 Magnetic Disk:

A magnetic disk is a data storage device that uses magnetism to store data on a rotating disk surface. Data is read and written using a read/write head.

1. Floppy Disk:

- Made of thin plastic coated with magnetic material.
- Portable and inserted into a floppy drive.
- Low storage capacity (1.44 MB).
- Now outdated and rarely used.

2. Hard Disk:

- Contains multiple rigid disks (platters) stacked in a metal case.
- Each disk surface has a magnetic coating.
- Large storage capacity (hundreds of GB to TB).
- Fixed inside the computer or external.
- Fast, reliable, and used in all modern systems.

🔸 **Advantages:**

- Reusable storage.
- Random access to any data.
- Large capacity in hard disks.

🔸 **Disadvantages:**

- Magnetic fields and dust can corrupt data.
- Mechanical parts may fail over time.

🌟 **Q13: Explain the structure and working of a Compact Disc (CD).**

❖ **Definition:**

A Compact Disc (CD) is a laser-based optical storage device used to store digital data like music, videos, or software.

🔹 **Structure:**

- Made of plastic coated with reflective aluminum.
- Contains pits (low areas) and lands (flat areas).
- These represent binary data (0s and 1s).

🔹 **Working:**

- A laser beam is directed onto the CD surface.
- Pits and lands reflect the laser differently.
- The reflected light is converted into electrical signals.
- These signals are translated back into digital data.

✅ **CD vs. DVD:**

- CD stores around 700 MB of data.
- DVD uses higher density, storing up to 4.7 GB or more.

🌟 **Q14: What is a Flash Drive? Describe its structure, usage, and advantages in daily life.**

❖ **Definition:**

A Flash Drive is a portable electronic storage device that uses integrated circuits (ICs) to store data.

🔹 **Structure:**

- Small chip-based device.
- Has a USB connector for direct insertion into a

computer.

- Stores data using electronic memory (no moving parts).

📘 **Usage:**

- Saving and transferring files.
- Backing up important documents, pictures, and videos.
- Running portable applications.

🔸 **Advantages:**

- Compact and easy to carry.
- Faster than CDs and floppy disks.
- Reusable and durable.
- No power needed when not in use.

🌟 **Q15: What is Word Processing? Explain its features and uses with examples.**

❖ **Answer:**

Definition: Word processing is the use of computer software to create, edit, format, and print text-based documents like letters, reports, and books.

✨ Main Features of Word Processing:

- **Typing and Editing Text**: Allows users to write and modify text easily.
- **Formatting Options**: Change font style, size, color, and alignment.
- **Moving and Copying Text**: Cut, copy, and paste content anywhere in the document.
- **Inserting Elements**: Add tables, images, charts, and graphics.
- **Saving and Printing**: Save documents for future use and print them as needed.

🔸 Examples of Use:

- Writing business letters and applications
- Preparing school assignments and books
- Designing invitation cards and reports

🔍 Summary:

Word processing has revolutionized the way we write. With features like formatting, spell check, and multimedia insertion, it saves time and improves

document quality.

🌟 **Q16: Define Data Management. How is data managed and monitored in modern institutions?**

❖ **Answer:**

Data management is the process of collecting, storing, organizing, and monitoring data to make it useful and secure.

⚙ **Data Management in Institutions:**

- **Hospitals**: Manage patient records using computer software and ID codes.
- **Schools**: Keep track of student performance, attendance, and reports.
- **Industries & Stores**: Monitor stock levels, create bills, and manage employees.

🔍 **Tools and Technology Used:**

- Optical Scanners & Barcodes: Read item codes for accurate billing.
- Central Computers: Control all data process from a single location.

- Monitoring Systems: Keep real-time data updates and alerts.

🔍 **Summary:**

Data management ensures efficiency and accuracy in daily operations of modern institutions. It saves time and helps in decision-making.

🌟 **Q17: What is Internet? Describe its structure and working in detail.**

❖ **Answer:**

The Internet is a global network of computers that connects millions of users worldwide to share data and communicate.

🌐 **Structure of the Internet:**

- **Network of Networks**: Local, national, and international networks linked together.
- **Connected via Systems**: Uses telephone lines, broadband, fiber optics, and satellites.
- **Communication Protocols**: Follows TCP/IP protocol for smooth data transfer.

⚙ Working of the Internet:

- Millions of devices are interconnected.
- Data is divided into small packets and sent to the destination.
- Routers and servers guide these packets.
- Information travels from one city to another within seconds.

🔍 **Summary:**

The Internet enables global communication and data sharing through an advanced system of networks, transforming how we live and work.

🌟 **Q18: Describe the main services provided by the Internet. Also explain the role of browsers.**

❖ **Answer:**

🔹 Main Internet Services:

- **Web Browsing**: Search for information using search engines.
- **Email**: Send and receive messages instantly.
- Social Media: Platforms like Facebook and

WhatsApp for communication.

- **E-commerce**: Online shopping and banking.

🖥️ Role of Browsers:

- Browsers are software applications that allow users to access websites.
- They display web pages in a readable form.
- Examples: Google Chrome, Mozilla Firefox, Safari, Opera.

🌟 Q19: What is Electronic Mail (E-mail)? Discuss its uses, advantages, and importance in daily life.

❖ **Answer:**

E-mail (Electronic Mail) is a method of sending digital messages using the Internet from one computer to another.

✉ Uses of E-mail:

- Sending formal and informal messages
- Sharing files and images as attachments
- Communication in education, business, and government

🔹 **Advantages:**

- **Fast and Instant**: Messages reach in seconds.
- **Low Cost**: Almost free compared to traditional mail.
- **File Sharing**: Easily send documents, pictures, videos.

🌟 **Q20: Explain the uses of Internet in modern society. How has it benefited us?**

❖ **Answer:**

🔹 **Uses of Internet in Society:**

- Fast Communication: E-mails, messaging apps, and video calls.
- Entertainment: Watching movies, playing games, and listening to music.
- Access to Information: Search engines like Google provide knowledge.
- Online Education: Students learn via Zoom, Google Classroom, and YouTube.
- E-commerce: Buy and sell products online.

- Online Banking and Bills: Pay bills and check balance from home.

🌟 **Q21: What are the major risks and crimes associated with computer usage? Explain with examples.**

❖ **Answer:**

🔹 **Common Computer Risks and Crimes:**

Health Issues: Eye strain, headache, and poor posture from excessive screen time.

Hacking: Unauthorized access to systems and private data.

Data Theft: Stealing credit card details or passwords.

Piracy: Copying and selling software illegally.

Fraud: Online scams and fake websites.

🔒 **Protection Methods:**

- Use of strong passwords
- ID cards or biometric verification
- Installing antivirus software

- Awareness programs for cyber safety

🌟 **Q22: What is computer hacking and how can we secure our systems against it?**

❖ **Answer:**

Computer hacking is the act of gaining unauthorized access to computer systems or networks to steal, damage, or misuse data.

⚠ **Types of Hacking Activities:**

- **Stealing personal data**: Credit card, passwords
- Deleting important files
- Spreading viruses or malware
- Controlling other systems remotely

🛡️ **Protection Against Hacking:**

- Use strong and unique passwords
- Enable firewalls and antivirus programs
- Two-factor authentication (password + code or fingerprint)
- Avoid clicking on suspicious links or emails

- Keep software updated

🔍 **Summary:**

Computer hacking is a serious threat. However, with proper digital safety practices, we can protect our systems and data from hackers.

Exercise Questions:

Review Questions

🌟 **Q17.1: What is the difference between data and information?**

❖ **Answer:**

🔹 **Data:**

- **Data** refers to raw facts and figures that have no meaning by themselves. It can be in the form of numbers, words, or symbols.
- **Example**: 82, “Ali”, 12/12/2008 – these are just values with no specific meaning.

🔹 Information:

- **Information** is the processed form of data that is meaningful and useful for decision-making.
- **Example**: "Ali scored 82 marks on 12/12/2008" – now the data has been arranged in a meaningful way, so it becomes information.

🔸 Key Differences:

- Data is raw and unprocessed, while Information is organized and meaningful.
- Information is obtained after processing the data.

🌟 Q17.2: What do you understand by Information and Communication Technology (ICT)?

❖ Answer:

Information and Communication Technology (ICT) refers to the integration of computing and communication technologies used to handle information.

🔹 Definition:

ICT includes all technologies used to collect, store, process, transmit, and share data and information.

Main Components:

1. Information Technology (IT): Refers to hardware and software used to process data.

2. Communication Technology (CT): Refers to devices and methods used to transfer data over distances (e.g., internet, mobile phones, optical fibres).

Uses of ICT:

- Education (e-learning platforms)
- Health (patient data systems)
- Business (e-commerce)
- Government (e-governance)

Result :ICT is essential in today's digital world as it connects people and enables the flow of information globally.

🌟 **Q17.3: What are the components of information technology? Clearly indicate the**

function of each component.

❖ **Answer:**

Information Technology (IT) has the following major components:

1. Hardware:

- These are the physical parts of a computer system.
- **Examples**: CPU, monitor, keyboard, mouse, printer.
- Function: Hardware is used for input, processing, output, and storage of data.

2. Software:

Set of instructions or programs that control hardware and perform specific tasks.

Types:

- System Software (e.g., Windows, Linux)
- Application Software (e.g., MS Word, Excel)
- Function: Software tells the hardware what to do.

🔸 3. Data:

- Raw material for information processing.
- **Function**: Data is processed by software to produce useful information.

🔸 4. Procedures:

- These are the rules and instructions for using computer systems.
- **Function**: Procedures guide users on how to operate systems effectively.

🔸 5. People (Users):

- Individuals who use computers and IT systems.
- **Function**: They operate the system, input data, and use the output.

🌟 **Q17.4: Differentiate between the Primary Memory and the Secondary Memory**

❖ **Answer:**

🔹 Primary Memory (Main Memory):

This is the memory directly accessible by the CPU.

It is used for temporary storage of data and

instructions during processing.

Types:

- RAM (Random Access Memory): Volatile – data is lost when power is off.
- ROM (Read Only Memory): Non-volatile – stores permanent instructions.

Characteristics:

- Faster than secondary memory.
- Limited storage capacity.
- Expensive.
- Temporary storage.

Secondary Memory (Backing Storage):

- Used for permanent data storage.
- Not directly accessed by CPU (requires I/O operations).

Examples:

- Hard Disk Drive (HDD)
- Compact Disc (CD)

- Flash Drive / USB

Characteristics:

- Slower than primary memory.
- Large storage capacity.
- Less expensive.
- Non-volatile (data retained even when power is off).

📍 **Key Difference:**

- **Access Speed:** Primary is fast, Secondary is slow.
- **Volatility**: Primary can be volatile (RAM), Secondary is non-volatile.
- **Usage**: Primary is for active processing, Secondary is for long-term storage.

🌟 **Q17.5: Name different information storage devices and describe their uses**

❖ **Answer:**

Information storage devices are used to save data and instructions either temporarily or permanently.

🔹 Common Storage Devices:

1. RAM (Random Access Memory):

- Used as temporary working memory.
- Stores running programs and data.
- Loses data when power is off.

2. ROM (Read Only Memory):

- Stores permanent instructions (like booting).
- Cannot be changed or erased easily.

3. Hard Disk Drive (HDD):

- Main device for long-term data storage.
- Stores software, files, OS, games, etc.

4. Compact Disc (CD):

- Optical disc used to store music, videos, software.
- Read using laser light.

5. Flash Drive (USB):

- Portable device for quick data transfer.
- Used to backup data, transfer files between

computers.

📍 **Uses:**

- Storing documents, pictures, and applications.
- Backing up important files.
- Installing software.
- Transferring data across devices.

🌟 **Q17.6: Explain briefly the transmission of radio waves through space**

❖ **Answer:**

Radio waves are a type of electromagnetic wave used for wireless communication. They transmit information such as audio, video, and data signals through the air.

🔹 **How Radio Waves are Transmitted:**

1. Transmission:

- A transmitter converts electrical signals (sound, data) into radio waves.
- These waves are sent into space through an antenna.

2. Propagation:

- Radio waves travel through air or space in all directions.
- They can reflect off buildings, bounce off the ionosphere, or pass through the atmosphere.

3. Reception:

- A receiving antenna catches the waves.
- A receiver converts them back into audio, video, or data signals.

📍 **Examples of Radio Wave Usage:**

- FM/AM Radio
- Television broadcasting
- Mobile communication
- Wi-Fi
- Satellite communication

🔍 **Result:** Radio wave transmission allows wireless communication over long distances. It plays a key role in radio, television, mobile networks, and the Internet.

🌟 Q17.7: How light signals are sent through optical fibre?

❖ Answer:

Optical fibre is a modern technology used to transmit data in the form of light signals. It is made of thin glass or plastic strands that can carry information at very high speeds.

🔹 Working of Optical Fibre:

1. Conversion of Signal:

- Electrical data signals are first converted into light signals using a laser or LED.

2. Transmission Through Fibre:

- These light signals travel through the fibre by bouncing (reflecting) inside the core, a process called Total Internal Reflection.
- This helps light to move even around curves in the cable.

3. Reception:

- At the receiving end, light signals are converted

back into electrical signals for computers or phones to understand.

🔹 Benefits of Optical Fibre:

- High speed and bandwidth.
- Less signal loss over long distances.
- Immune to electromagnetic interference.

➤ **Example:** Used in Internet cables, telephone networks, cable TV, and medical imaging (endoscopy).

🌟 Q17.8: What is computer? What is the role of computer in everyday life?

❖ Answer:

Definition of Computer: A computer is an electronic machine that receives data (input), processes it, and gives meaningful results (output). It works using both hardware and software.

📍 Role of Computer in Everyday Life:

1. Education:

- Used in schools for teaching, exams, e-learning,

and educational software.

2. **Business:**

- Manages records, billing, accounting, and online business activities (e-commerce).

3. **Healthcare:**

- Used in hospitals for patient records, lab reports, and medical research.

4. **Communication:**

- Through emails, video calls, social media, and messaging apps.

5. **Entertainment:**

- Watching movies, playing games, listening to music.

6. **Banking:**

- Online transactions, ATM services, and digital payments.

7. **Science and Research:**

Used in labs, weather forecasting, space exploration, and data analysis.

🔍 **Result**: Computers have become a vital part of modern life, making tasks faster, more accurate, and more convenient.

🌟 **Q17.9: What is the difference between hardware and software? Name different software**

❖ **Answer:**

🔹 **Hardware**:

- Hardware refers to the physical parts of a computer that you can touch and see.
- **Examples**: Monitor, Keyboard, Mouse, CPU, Printer, Hard Disk.

🔹 **Software:**

Software is a set of instructions or programs that tell the hardware what to do. It cannot be touched – it is intangible.

Examples: MS Word, Windows, Chrome, Photoshop, Zoom.

📍 **Key Differences:**

Aspect Hardware Software

Aspect	Hardware	Software
Nature	Physical and tangible	Logical and intangible
Function	Performs tasks physically	Gives instructions to hardware
Failure Type	Can wear out or break	Can crash or get corrupted
Examples	CPU, Mouse, Keyboard	MS Word, Windows, Google Chrome

🔹 Types of Software:

1. System Software:

- Controls computer hardware.
- **Examples**: Windows OS, Linux, macOS.

2. Application Software:

Performs user-specific tasks.

Examples: MS Excel, MS PowerPoint, Adobe Photoshop.

3. Utility Software:

- Helps manage and maintain the computer.
- **Examples**: Antivirus, Disk Cleanup.

🌟 Q17.10: What do you understand by the term word processing and data managing?

❖ **Answer:**

✅ **Word Processing:**

Definition:

Word processing is the use of computer software to create, edit, format, and print text-based documents.

📍 **Main Features:**

- Typing and editing text
- Changing font styles, colors, and sizes
- Aligning text, adding bullets/numbering
- Inserting tables, images, and charts
- Saving and printing documents

➤ **Examples of Word Processing Software:**

1. MS Word

2. Google Docs

3. WPS Office

📝 **Uses:**

- Writing letters, essays, reports, books
- Making resumes and official documents

✅ Data Managing:

Definition:

Data managing refers to the collection, organization, storage, and control of data using computer systems.

📍 **Functions:**

- Inputting and saving data
- Sorting, searching, and editing data
- Generating reports and summaries
- Managing records securely

➤ **Examples:**

- Managing student records in schools
- Keeping patient data in hospitals

- Inventory management in shops

🌟 **Q17.11: What is Internet? Internet is a useful source of knowledge and information. Discuss.**

❖ **Answer:**

✅ **Definition of Internet:**

The Internet is a global network of connected computers and devices that communicate and share information using various technologies like Wi-Fi, broadband, and fiber optics.

📌 It is often described as a "network of networks.

🔹 **Why Internet is a Useful Source of Knowledge:**

1. Access to Information:

- Millions of websites offer free knowledge
- Topics include science, history, technology, religion, etc.
- **Examples**: Wikipedia, Khan Academy, StudynotesPk and YouTube.

2. Online Learning & E-books:

- Students can learn through video lectures,

PDFs, and online tests

- Schools and universities use learning platforms

3. Latest News & Research:

- Get updates about current affairs, weather, and global events

4. Communication Tools:

- Emails, messaging apps, and video calls help connect with experts and teachers

5. Educational Search Engines:

Google, Bing, and Yahoo help find trusted knowledge quickly

🌟 **Q17.12: Discuss the role of information technology in school education.**

❖ **Definition of Information Technology (IT):**

Information Technology refers to the use of computers, software, networks, and internet tools to manage and process information.

Role in School Education:

1. E-Learning:

- Online classes and lectures using platforms like Zoom, Google Meet
- Students attend classes from home during emergencies
- **2. Digital Content:**
- Interactive videos, animations, and presentations make learning fun
- Use of multimedia improves understanding

3. Computer Labs:

- Students learn to use computers, type, and use educational software

4. Online Exams and Results:

- Schools use IT to conduct tests, check results, and maintain records

5. Communication:

- Teachers and students communicate via emails, WhatsApp, and school portals

6. School Management:

- Attendance, fees, reports, and schedules are

managed using IT software

🔍 Result:

Information Technology has made education more interactive, accessible, and efficient. It helps both teachers and students in improving learning outcomes and preparing for a digital future.

CONCEPTUAL QUESTIONS

🌟 **Q17.1: Why is optical fibre a more useful tool for the communication process?**

❖ **Answer:**

Optical fibre is considered a more useful and modern tool for communication due to the following reasons:

1. High-Speed Data Transmission:

Optical fibre can transmit data at the speed of light, making communication much faster than traditional cables.

2. Large Bandwidth:

It can carry more data over long distances without losing signal strength, which is ideal for internet, telephone, and cable TV services.

3. Less Signal Loss:

Compared to copper wires, optical fibre has very low signal loss, ensuring clear and uninterrupted communication.

4. Immune to Electromagnetic Interference:

Optical fibre does not get affected by magnetic fields or electrical noise, making it more reliable and stable.

5. Lightweight and Flexible:

It is thinner and lighter than metal cables, allowing easier installation and use in buildings, offices, and under the sea.

🌟 **Q17.2: Which is more reliable: floppy disk or a hard disk?**

❖ **Answer:**

Hard disk is more reliable than a floppy disk for many important reasons:

1. Storage Capacity:

- **Floppy Disk:** Can store only 1.44 MB
- **Hard Disk**: Can store hundreds of GBs or even TBs of data

✅ Hard disk can store much more data.

2. Speed:

- Hard disks have faster read/write speeds, allowing data to be saved or retrieved quickly.

3. Durability:

- Floppy disks are easily damaged by dust, magnets, or bending.
- Hard disks are more protected and last longer under normal usage.

4. Modern Usage:

- Floppy disks are now outdated, while hard disks are still in use in computers, laptops, and servers.

🔍 Result:

Hard disks are far more reliable, faster, and capable

than floppy disks, which are now rarely used.

🌟 **Q17.3: What is the difference between RAM and ROM memories?**

❖ **Answer:**

✅ **Difference Between RAM and ROM**

1. Definition:

RAM (Random Access Memory):

- It is a temporary memory that stores data and programs currently being used by the computer.
- ROM (Read Only Memory):
- It is a permanent memory that stores the startup instructions and essential programs required for booting the computer.

🔹 **2. Volatility:**

RAM:

- It is volatile memory, which means all stored data is lost when power is turned off.

ROM:

- It is non-volatile memory, so the data remains

intact even after power is turned off.

3. Function:

RAM:

- It helps the CPU to read and write data quickly, improving system performance during operation.

ROM:

- It contains pre-written instructions that help to start and operate the computer (e.g., BIOS).

4. Data Modification:

RAM:

- Data can be read and written easily and frequently.

ROM:

- Data is usually read-only and cannot be changed easily by the user.

5. Speed:

RAM:

- RAM is faster and allows quick access to data.

- **ROM:**

ROM is slower in comparison to RAM.

➤ 6. Examples:

RAM:

- DRAM, SRAM

ROM:

- PROM, EPROM, EEPROM

🔍 Summary:

- **RAM** and **ROM** are both essential types of memory in a computer.
- **RAM** provides fast access and performance during active tasks.
- **ROM** provides critical instructions that allow the computer to start and function properly.

Note:

This chapter is designed to provide a solid foundation of knowledge, with the goal of deepening understanding and encouraging further exploration of the subject. The content has been carefully selected to support effective learning and inspire students to engage with the topic more deeply.

Author: Muhammad Asghar

Purpose: To contribute to education by offering insightful, valuable content that enhances learning and understanding.

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