

MODULE - 1

UNDERSTANDING OF HARDWARE AND ITS COMPONENTS

Q-1 Multiple Choice Question

1. Which of the following is NOT a component of the CPU?

1. ALU
2. RAM
3. CU
4. 1 and 3 both

Ans: RAM

2. What is the function of RAM in a computer?

Ans:- The function of RAM in a computer is to temporarily store data and instruction that the cpu needs while performing tasks.

- RAM acts as the computer short-term memory enabling fast and efficient performance while tasks are being executed.
- RAM allows a computer to run multiple programs at once without slowing down.
- Quickly read and write

3. Which of the following is a primary storage device?

1. HDD
2. SSD
3. SD card
4. 1 and 2 both

Ans:- 1 and 2 both

4. What is the purpose of a GPU?

Ans :- A GPU is especially used to enhance visual performances and speed up the complex computation especially those involving in images and graphical content

Section 2: True or False

5. True or False: The motherboard is the main circuit board of a computer where other components are attached.

Ans:- True

6. True or False: A UPS (Uninterruptible Power Supply) is a hardware device that provides emergency power to a load when the input power source fails.

Ans:- True

7. True or False: An expansion card is a circuit board that enhances the functionality of a component.

Ans:- True

Section 3: Short Answer

8. Explain the difference between HDD and SSD?

Ans:- HDD

- Uses spinning and magnetic disks to read and write data with mechanical arm
- Not much expensive compared to ssd
- Slower data access and boot times
- Noisy due to spinning disks
- Consumes more power
- Longer life span

HDD'S are better for larger storage at lower cost

SDD

- Uses flash memory with no moving parts
- Faster data access and boot times
- More expensive than HDD
- Not much noisy silent operations
- Uses less power consumption

SSD'S are better for speed, performance, and durability.

9. Describe the function of BIOS in a computer system.

Ans:-

Key functions of BIOS system

:- Post (Power on self test) check whether RAM,CPU,and keyboard are correctly during startup.

- :- Locates and starts os from storage devices like HDD,SDD.
- :- Allows user to config hardware settings via boots start menu.
- :- Provides the low-level control for system hardware components.

10. List and briefly explain three input devices commonly used with computers.

Ans :- Keyboard

Mouse

Scanner

These three are commonly used input devices used with computers.

KEYBOARD

Allows user to input text, command, numbers using keys. essential for typing documents, coding, and navigating systems commands

MOUSE

A pointing device which is used to point on screen things with on-point cursor used for dragging,selecting and interacting with items on screen

SCANNER

A scanner converts physical documents or images into digital format. It captures the content from paper and transfers it to the computer for editing, storage, or sharing.

Section 4: Practical Application

11. Identify and label the following components on a diagram of a motherboard

Ans:

:-CPU (Central Processing Unit) Socket

- **Location:** Near the center/top of the board.

Looks Like: Large square socket with many pinholes or pads, often covered by a heatsink or fan.

RAM Slots (Memory Slots)

- **Location:** Near the CPU, vertical or horizontal slots in a group (usually 2 or 4).
- **Looks Like:** Long, thin slots with clips on both ends.

SATA Connectors

- **Location:** Lower right edge of the motherboard.
- **Looks Like:** Small, flat L-shaped connectors (usually 4–6), typically labeled SATA1, SATA2, etc.

PCIe Slot (Peripheral Component Interconnect Express)

- **Location:** Lower half of the motherboard.
- **Looks Like:** Long horizontal slot, often in black, gray, or blue. The longest one is usually **PCIe x16** (for graphics cards), while shorter ones are **PCIe x1** (for Wi-Fi cards, etc.).

12. Demonstrate how to install a RAM module into a computer.

Ans:

1. Power Down and Unplug the Computer

- Shut down your PC completely.
- Unplug the power cable from the wall.
- Press the power button for 5 seconds to discharge any residual electricity.

2. Open the Computer Case

- Remove the side panel (usually with screws or thumb screws).
- Place the case on a clean, flat, static-free surface.

3. Ground Yourself

- Use an anti-static wrist strap or touch a metal part of the case to prevent static electricity damage.

4. Locate the RAM Slots

- Find the memory slots on the motherboard — they are long slots, usually near the CPU.
- Most desktop motherboards have 2 to 4 DIMM slots.

5. Orient the RAM Correctly

- Align the notch on the bottom of the RAM stick with the key in the slot.
- RAM only fits one way — don't force it.

6. Insert the RAM Module

- Open the clips on either end of the RAM slot.
- Firmly press the RAM straight down into the slot. You should hear a **click** as the side clips snap into place.
- Make sure it's fully seated and level.

7. Close the Case and Reconnect Power

- Replace the side panel and screw it back on.
- Plug in the power cable.

8. Boot the Computer

- Turn on the PC and go into BIOS/UEFI (usually by pressing **Delete**, **F2**, or another key at startup).
- Check that the system detects the new RAM.
- If everything looks good, continue to boot into your operation

Section 5: Essay

13. Discuss the importance of proper cooling mechanisms in a computer system. Include examples of cooling methods and their effectiveness

Importance of Proper Cooling Mechanisms

1. **Prevents Overheating:** Excess heat can cause system instability, crashes, and potential hardware failure. Cooling ensures that temperatures stay within safe operating limits.
2. **Maintains Performance:** High temperatures can cause components to throttle (reduce speed) to avoid damage, resulting in slower performance. Effective cooling maintains consistent processing speeds.
3. **Extends Hardware Lifespan:** Prolonged exposure to high heat can degrade electronic components, leading to reduced lifespan. Proper cooling helps preserve the system.
4. **Enhances System Reliability:** Cooler systems experience fewer errors and malfunctions, leading to improved reliability in both consumer and enterprise environments.

Examples of Cooling Methods and Their Effectiveness

1. Air Cooling

- **Description:** Uses heat sinks and fans to dissipate heat from components like the CPU and GPU.

- **Effectiveness:**

Moderately effective for most consumer systems.

- Less efficient in high-performance or overclocked systems.

- **Example:** A tower CPU cooler with a large heat sink and a fan (e.g., Cooler Master Hyper 212).

2. Liquid Cooling (Water Cooling)

- **Description:** Circulates coolant through a closed loop to absorb heat and move it to a radiator for dissipation.
- **Effectiveness:**

Highly effective, especially for high-performance systems.

More expensive and complex to install.

- **Example:** AIO (All-in-One) coolers like the Corsair H100i.

14. Explain the concept of bus width and its significance in computer architecture.

Bus Width in Computer Architecture

Bus width refers to the number of bits that can be transmitted simultaneously across a bus in a computer system. A **bus** is a communication system that transfers data between components such as the CPU, memory, and input/output devices.

There are different types of buses, such as:

- **Data bus** (transfers actual data)
- **Address bus** (carries memory addresses)
- **Control bus** (carries control signals)

Significance of Bus Width

Data Transfer Rate:

- A wider data bus means more bits can be transferred at once, increasing the overall data transfer rate.

Memory Access:

- A wider **address bus** allows the CPU to access more memory.
- For instance, a 32-bit address bus can address up to 4 GB of RAM, while a 64-bit address bus can theoretically address up to 18 exabytes.

Performance:

- Systems with wider buses tend to perform better, especially in tasks that require high data throughput (e.g., gaming, video editing, scientific computing).

Compatibility:

- Bus width determines compatibility between the processor and other components. A mismatch can lead to performance bottlenecks or require additional components like bridges or adapters.