

## **Section 1: Multiple Choice**

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

**Ans: - 2. RAM**

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

**Ans: -**

RAM (Random Access Memory) works as a short-term memory for computers. Its main role is to store data temporarily.

It is a volatile memory that transfers data to the CPU. RAM is nearest to the CPU. Which is why is a fast storage device for the CPU.

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

**Ans: - 4. 1 and 2 both**

**4. What is the purpose of a GPU?**

**Ans: -** The purpose of GPU is to provide smooth visual performance and rendering of images, videos, and animations.

## **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 (Hard Disk Drive)** stores data on spinning magnetic disks and uses a mechanical arm to read/write data. It is slower, makes noise, is cheaper, and suitable for storing large files.

**SSD (Solid State Drive)** stores data on flash memory chips with no moving parts. It is much faster, quieter, more durable, but more expensive than HDD. Ideal for faster system performance.

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

**Ans: -**

**BIOS (Basic Input/Output System)** is firmware stored on a chip on the motherboard. Its main functions are:

1. **Boot Process:** It initializes and tests hardware components (POST - Power-On Self-Test) when the computer is turned on.
2. **Boot Loader:** It locates and starts the operating system from the hard drive or SSD.
3. **Hardware Control:** It provides low-level control over system components like keyboard, mouse, and storage.
4. **System Settings:** It allows users to configure hardware settings (boot order, system clock, etc.) through the BIOS setup utility.

In short, BIOS is essential for starting the computer and managing communication between hardware and software.

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

**Ans: -**

**? Keyboard:**

Used to enter text, numbers, and commands into the computer. It includes keys for letters, numbers, and functions.

**? Mouse:**

A pointing device used to move the cursor, click, drag, and interact with items on the screen.

**? Scanner:**

Captures images or documents and converts them into digital format for the computer to process or store.

#### **Section 4: Practical Application [complete]**

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

- CPU
- RAM slots
- SATA connectors
- PCI-E slot

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

**Ans : -**

#### **Steps to Install RAM:**

**1. Power Off and Unplug:**

Shut down the computer and unplug the power cable.

**2. Open the Case:**

Use a screwdriver to remove the side panel of the CPU case.

**3. Locate RAM Slots:**

Find the RAM slots on the motherboard (long slots near the CPU).

**4. Align the RAM Module:**

Check the notch on the RAM and match it with the slot's ridge. It only fits one way.

**5. Insert the RAM:**

Hold the RAM by the edges, align it with the slot, and press down firmly on both ends until the side clips snap into place.

**6. Close the Case:**

Once the RAM is installed, put the side panel back and screw it in.

**7. Reconnect and Power On:**

Plug the power cable back and start the computer. Check if the RAM is detected.

## **Section 5: Essay**

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

**Ans :-**

### **Importance of Proper Cooling Mechanisms in a Computer System**

Proper cooling is essential for the stability, performance, and lifespan of a computer system.

As electronic components such as the CPU, GPU, and power supply generate heat during operation, effective cooling is required to prevent overheating, which can lead to hardware damage, system crashes, or reduced performance due to thermal throttling.

### **Why Cooling is Important**

**1. Prevents Overheating:**

Excessive heat can damage sensitive components and cause permanent failure. Proper cooling maintains safe operating temperatures.

**2. Improves Performance:**

High temperatures can cause the CPU and GPU to reduce their speed to avoid damage. Efficient cooling helps maintain optimal performance.

### **3. Extends Lifespan:**

Heat accelerates wear and tear. Keeping components cool increases their durability and reliability.

### **4. System Stability:**

Overheating can cause crashes, unexpected shutdowns, or data corruption. Cooling ensures smooth and stable operation.

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## **Types of Cooling Methods**

### **1. Air Cooling:**

- Fans are the most common cooling method. They draw cool air in and push hot air out.
- Heat sinks are metal blocks attached to components like the CPU. They absorb and disperse heat with the help of airflow.
- Effectiveness: Affordable and sufficient for most standard systems.

### **2. Liquid Cooling:**

- Uses coolant, pumps, and radiators to transfer heat away from the CPU or GPU.
- Effectiveness: More efficient and quieter than air cooling; ideal for gaming or high-performance systems.

### **3. Thermal Paste:**

- Applied between the CPU and the heat sink to fill microscopic gaps and improve heat transfer.
- Effectiveness: Small but crucial for effective cooling.

### **4. Passive Cooling:**

- Relies on heat sinks and natural airflow, without fans or moving parts.
- Effectiveness: Silent, but only suitable for low-power devices.

## **5. Phase-Change and Peltier Cooling (Advanced):**

- Used in extreme systems, these methods use refrigeration or electrical cooling plates.
- Effectiveness: Extremely powerful but expensive and complex.

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

**Ans:-**

### **Concept of Bus Width and Its Significance in Computer Architecture**

In computer architecture, a bus is a communication system that transfers data between various components of a computer, such as the CPU, memory, and input/output devices.

Bus width refers to the number of bits that can be transmitted simultaneously across the bus.

It plays a crucial role in determining how much data can be transferred at once, directly impacting the computer's performance and processing speed.

### **Understanding Bus Width**

**Bus width is usually measured in bits (e.g., 8-bit, 16-bit, 32-bit, 64-bit). A wider bus can transfer more bits of data in a single operation. For instance:**

- A 32-bit bus can carry 32 bits (or 4 bytes) of data at a time.
- A 64-bit bus can carry 64 bits (or 8 bytes) of data at a time.

**The bus can be categorized into three types:**

1. Data Bus: Carries actual data being processed.
2. Address Bus: Carries memory addresses from the CPU to other components.
3. Control Bus: Carries control signals (e.g., read/write commands).

**Among these, the data bus width is most commonly referred to when discussing bus width.**

### **Significance of Bus Width**

**1. Data Transfer Speed:**

A wider bus allows more data to be transferred in each cycle, improving overall system throughput. For example, a 64-bit bus can move double the data per clock cycle compared to a 32-bit bus.

**2. Processor Performance:**

Modern CPUs and memory systems rely on wide buses to quickly exchange large amounts of data. Wider buses reduce the number of cycles required to complete a task, making the system faster.

**3. Memory Access:**

The width of the address bus determines how much memory the system can address. A 32-bit address bus can access up to 4 GB of RAM, while a 64-bit bus can theoretically access up to 18 exabytes.

**4. System Compatibility:**

Bus width affects compatibility between hardware components. For example, a 64-bit processor may not fully utilize its capabilities if connected to a 32-bit data bus.