

Section 1: Multiple Choice

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

Ans : RAM

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

Ans : RAM is a computer's short-term memory that stores data for quick access and temporary use.

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

Ans : HDD and SSD

4. What is the purpose of a GPU?

Ans : A GPU (Graphics Processing Unit) is designed to handle complex graphical computations efficiently.

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 :

Feature	HDD	SSD
Speed	Slower(50 – 120 Mb/s)	Faster(200-5000Mb/s)
Cost	Cheaper	More Expensive
Power Usage	Higher	Lower

Storage capacity	Typically larger(up to 20TB)	Usually smaller(up to 8TB)
------------------	------------------------------	----------------------------

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

Ans : BIOS (Basic Input/Output System) initializes hardware during startup and loads the operating system. It manages system settings, performs hardware checks, and ensures communication between software and hardware components.

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

Ans :

Keyboard: Used for typing text, commands, and shortcuts.

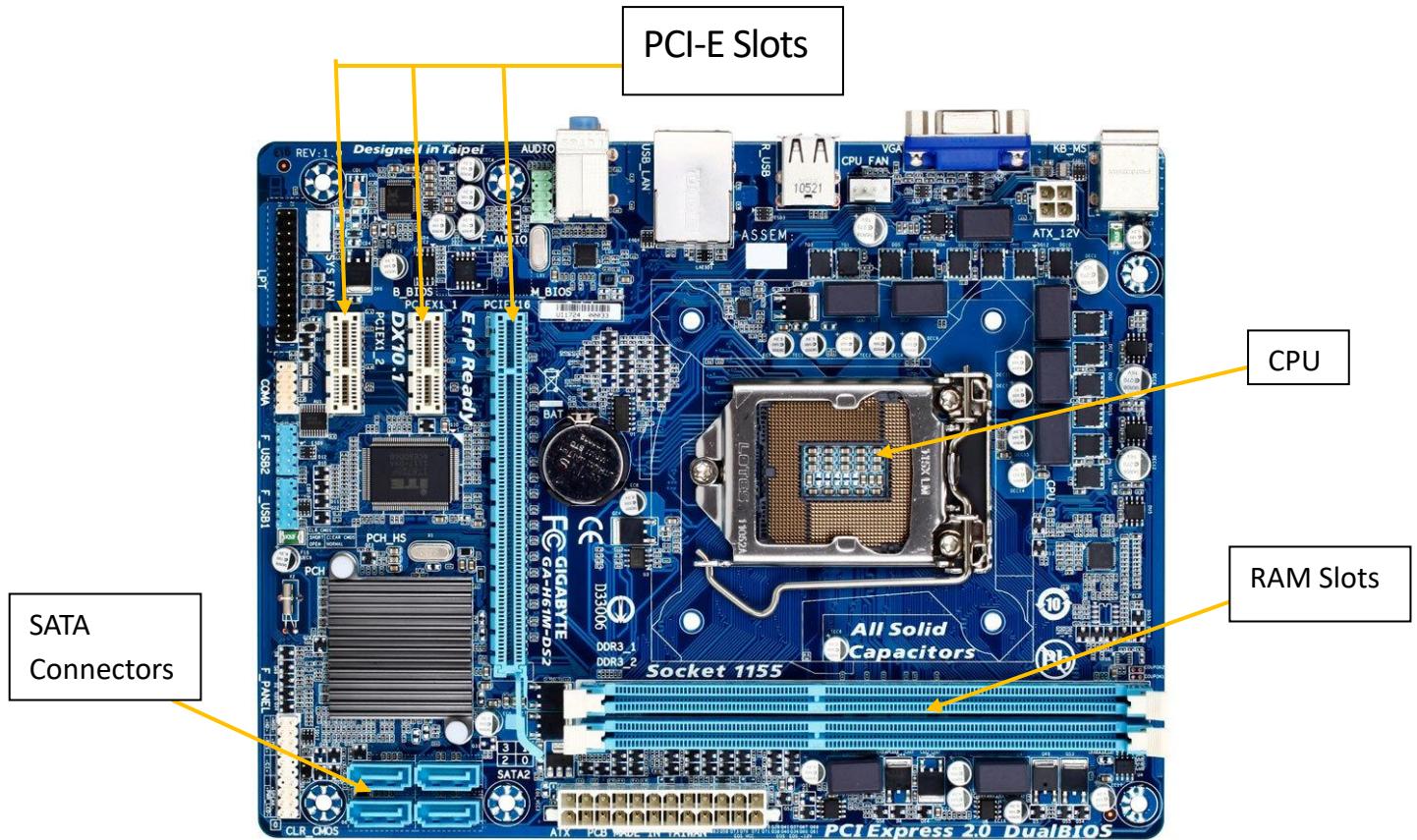
Webcam: Provides live video input for conferencing and streaming.

Mouse: Helps navigate and interact with on-screen elements.

Section 4: Practical Application

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 a RAM Module:

- Power Down & Unplug** – Shut down your computer, disconnect all cables, and remove the power source.
- Access the Motherboard** – Open the side panel of your computer case to expose the motherboard.
- Locate RAM Slots** – Identify the RAM slots, usually near the CPU, and check the orientation of the slot notch.
- Remove Existing Modules (If Needed)** – If replacing RAM, unclip and carefully remove the existing sticks.
- Insert the New RAM Module** – Align the notch on the RAM module with the slot, then firmly press down until the side clips click into place.

6. **Secure and Close the Case** – Ensure the RAM is properly seated, then close the case and reconnect all components.
7. **Power On & Verify** – Boot up your system and check the BIOS or Task Manager (Windows) to confirm the RAM is recognized.

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 in a computer system is essential to ensure optimal performance, longevity, and reliability. Computers generate heat during operation, primarily from components like the CPU, GPU, and power supply. Without efficient cooling, excess heat can lead to thermal throttling, reduced performance, hardware damage, and even system failure. Effective cooling mechanisms help maintain stable temperatures and enhance the overall efficiency of a system.

Effects of Cooling

- **Thermal Throttling** – When components overheat, they automatically reduce performance to avoid damage, leading to slower processing speeds.
- **Component Degradation** – Excessive heat accelerates wear and tear on hardware, shortening its lifespan.
- **System Instability** – Overheated components can cause crashes, errors, and unexpected shutdowns.
- **Reduced Efficiency** – A hot system consumes more power, making it inefficient and leading to increased energy costs.

Types of Cooling Mechanisms

1. Air Cooling

Air cooling is the most common and cost-effective cooling method. It relies on heat sinks and fans to dissipate heat from critical components.

- **Heat Sink & Fan (HSF)** – Heat sinks are made of metal (usually aluminum or copper) and draw heat away from components like the CPU and GPU. Attached fans blow air to enhance heat dissipation.

- **Case Fans** – Installed within the computer chassis to improve overall airflow and prevent hot air buildup.
- **Effectiveness:** Air cooling is sufficient for most standard desktops and gaming PCs. However, it may struggle under high workloads or extreme overclocking.

2. Liquid Cooling

Liquid cooling systems use coolant to transfer heat away from components more efficiently than air cooling.

- **Closed-loop Liquid Coolers (AIO Coolers)** – Preassembled liquid cooling units with a pump, radiator, and tubes, ideal for CPU cooling.
- **Custom Water Cooling Systems** – Advanced systems with individually designed loops, cooling multiple components like the CPU and GPU.
- **Effectiveness:** Liquid cooling is highly efficient for high-performance systems, providing superior heat dissipation compared to air cooling. However, it is more expensive and requires maintenance.

3. Phase-Change Cooling

Phase-change cooling is a specialized method used in extreme overclocking scenarios.

- **Vapor Compression (Like Refrigeration Systems)** – Uses compressed gas to create sub-zero temperatures.
- **Effectiveness:** This method is highly effective but is rarely used outside of competitive overclocking due to its complexity and cost.

4. Thermal Paste & Passive Cooling

- **Thermal Paste** – Applied between the CPU/GPU and heat sink to improve heat transfer.
- **Passive Cooling** – Heat dissipation without fans, using large metal heat sinks or cooling pads (common in laptops and low-power devices).
- **Effectiveness:** Passive cooling works for low-power systems, but high-performance computers require active cooling methods.

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

Ans :

Bus width refers to the number of bits that can be transmitted simultaneously between different components within a computer system, such as the CPU, memory, and peripheral devices. It plays a crucial role in determining the overall speed and efficiency of data processing.

Significance of Bus Width

1. **Data Transfer Speed** – A wider bus allows more data to be transferred per cycle, increasing system performance.
2. **Memory Addressing** – The width of the address bus dictates the maximum amount of memory a processor can address. For example, a 32-bit address bus can theoretically address up to 4GB of memory.
3. **System Bandwidth** – A wider bus increases bandwidth, enabling faster communication between the CPU and other components.
4. **Compatibility & Scalability** – Bus width affects hardware compatibility, influencing choices in upgrading processors, RAM, and graphics cards.

Examples of Bus Types

- **Data Bus** – Transfers actual data between components.
- **Address Bus** – Carries memory addresses to access specific locations.
- **Control Bus** – Sends signals to manage operations like read/write.

