Assignment :

Module -1: Understanding of Hardware and Its Components

Section 1: Multiple Choice

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

    1. ALU

    2. RAM

    3. CU

    4. 1 and 3 both

Answer: 2.RAM

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

Answer:

- Random access memory (RAM) is the best-known form of computer memory.

- RAM is considered as volatile memory, which means that the stored information is lost when there is no power.

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

    1. HDD

    2. SSD

    3. SD card

    4. 1 and 2 both

Answer: 4. 1 and 2 both

4. What is the purpose of a GPU?

Answer: A GPU (Graphics Processing Unit) is designed to accelerate rendering graphics and processing complex calculations, especially for tasks like gaming, video editing, AI, and scientific computing. It handles parallel processing efficiently, making it much faster than a CPU for specific workloads.

Section 2: True or False

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

Answer: 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.

Answer: True

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

Answer: True

Section 3: Short Answer

8. Explain the difference between HDD and SSD.

Answer : HDD (Hard Disk Drive) and SSD (Solid State Drive) are both storage devices, but they differ in technology and performance. HDDs use spinning magnetic disks to read and write data, making them slower and more prone to mechanical failure. SSDs, on the other hand, use flash memory with no moving parts, offering faster speeds, better durability, and lower power consumption.

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

Answer : BIOS (Basic Input/Output System) is firmware that initializes and tests hardware components during the boot process. It also loads the operating system and provides basic control over system settings, such as boot order and hardware configurations.

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

Answer : • **Keyboard** – A device used for typing text, commands, and inputting data into a computer.

• **Mouse** – A pointing device that allows users to interact with the graphical user interface (GUI) by clicking, dragging, and selecting items.

• **Scanner** – A device that converts physical documents or images into digital format for storage, editing, or sharing.

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

Answer: ● **CPU (Central Processing Unit):** Located in the large square socket, usually in the upper-middle part of the motherboard, covered by a heatsink or fan.

● **RAM Slots:** Long, narrow slots (usually 2-4) located near the CPU socket where RAM modules are installed.

● **SATA Connectors:** Small L-shaped ports (usually in a group) on the side of the motherboard, used for connecting storage devices like HDDs and SSDs.

● **PCI-E Slot:** A long expansion slot, typically used for installing graphics cards and other expansion cards, found near the middle or lower part of the motherboard.
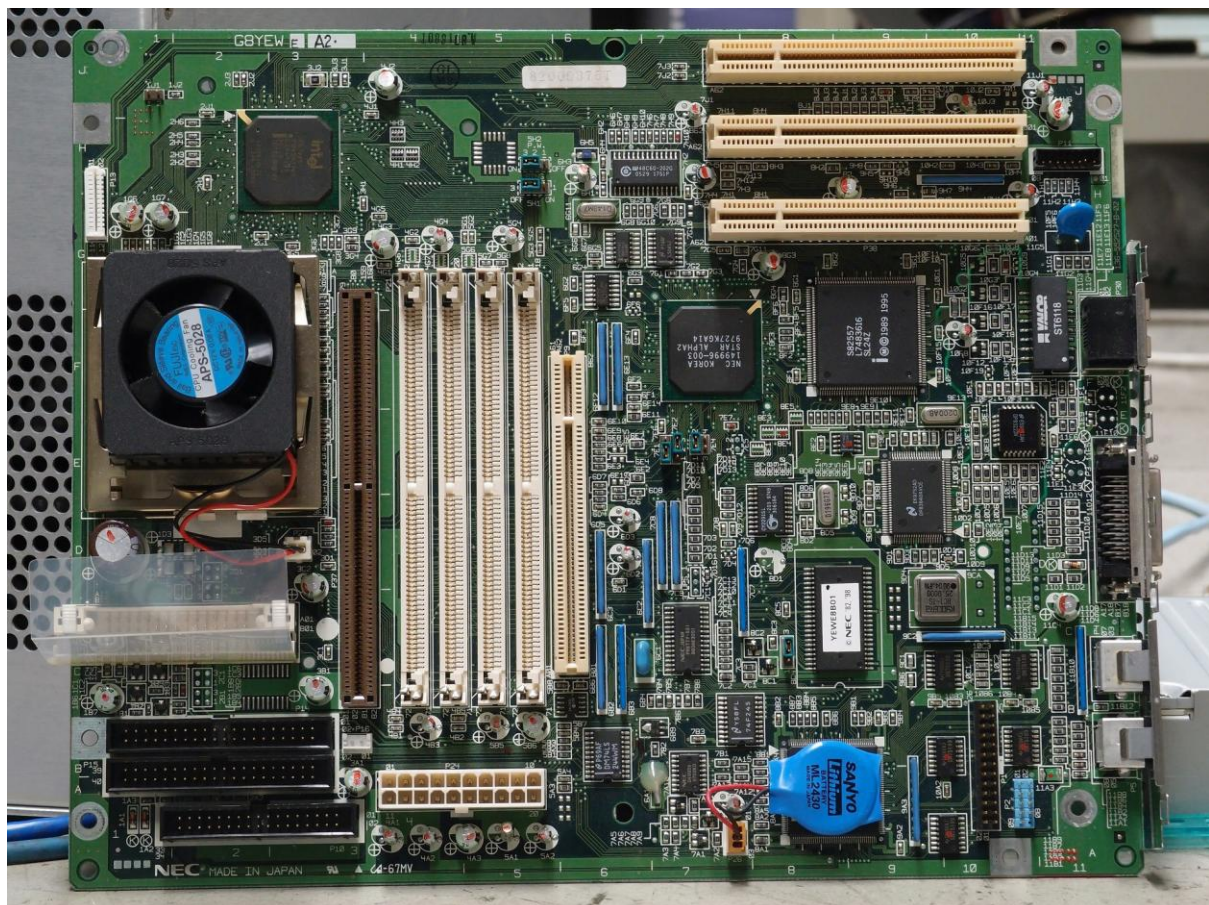
12. Demonstrate how to install a RAM module into a computer.

Answer : • **Power Off and Unplug:** Ensure the computer is turned off and unplugged.

• **Open the Case:** Remove the side panel to access the motherboard.

• **Locate RAM Slots:** Find the long RAM slots near the CPU.

• **Align the RAM Module:** Check the notch on the RAM module and match it with the slot to ensure proper orientation.

• **Insert the RAM:** Push the RAM module firmly into the slot until the clips on both sides click into place.

• **Secure the Case and Power On:** Close the case, plug in the power, and turn on the computer to check if the RAM is detected properly.

Section 5: Essay

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

Answer : Cooling is crucial in a computer system to prevent overheating, which can lead to reduced performance, hardware damage, and system crashes. As components such as the CPU and GPU process data, they generate heat, and without proper cooling, this heat can degrade performance and shorten the lifespan of the hardware.

Cooling Methods and Their Effectiveness:

1. **Air Cooling (Fans & Heat Sinks)** – The most common cooling method, where heat sinks absorb heat and fans dissipate it. Effective for standard computing needs but may struggle with high-performance tasks.

2. **Liquid Cooling (Water Cooling Systems)** – Uses liquid coolant to absorb and transfer heat away from components. More effective than air cooling, especially for high-performance gaming and workstation PCs.

3. **Thermal Paste & Heat Spreaders** – Thermal paste improves heat transfer between the CPU/GPU and the heat sink, while heat spreaders distribute heat efficiently across components.

4. **Phase Change Cooling & Liquid Nitrogen Cooling** – Extreme cooling solutions used in overclocking and high-performance computing, capable of reaching sub-zero temperatures.

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

Answer : In computer architecture, **bus width** refers to the number of bits that can be transmitted simultaneously between different components, such as the CPU, memory, and storage devices. It plays a crucial role in determining the speed and efficiency of data transfer within the system.

Importance of Bus Width:

1. **Faster Data Transfer** – A wider bus can transfer more data per clock cycle. For example, a 64-bit bus can transfer twice as much data as a 32-bit bus in the same amount of time.
2. **Improved System Performance** – Higher bus width reduces bottlenecks, allowing the CPU to process more data without waiting for slower data transfers.
3. **Impact on RAM and Processing Power** – Modern processors and motherboards use a 64-bit memory bus, which allows systems to utilize large amounts of RAM efficiently, benefiting multitasking and high-performance applications.