

## Assignment - Completed

### 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)**

Explanation: The CPU consists of the ALU (Arithmetic Logic Unit) and CU (Control Unit). RAM is a separate memory component.

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

**Answer: RAM (Random Access Memory) temporarily stores data and instructions that the CPU needs while performing tasks for fast access and processing.**

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)**

Explanation: HDD and SSD are primary storage devices used to store the operating system and user data long-term. SD cards are typically removable secondary storage.

4. What is the purpose of a GPU?

**Answer: A GPU (Graphics Processing Unit) accelerates the rendering of images and complex calculations, especially for graphics, video processing, and parallel computation tasks.**

#### Section 2: True or False

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

**Answer: TRUE**

2. 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**

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

**Answer: TRUE**

#### Section 3: Short Answer

1. Explain the difference between HDD and SSD.

**Answer: An HDD (Hard Disk Drive) uses spinning magnetic platters and a read/write head to store and retrieve data. It is generally slower, more susceptible to mechanical failure, and consumes more power. An SSD (Solid State Drive) uses flash memory (no moving parts), which makes it significantly faster, more durable, and more power-efficient.**

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

**Answer: The BIOS (Basic Input/Output System) initializes and performs POST (Power-On Self Test) on hardware components during startup, sets up low-level hardware settings, and then loads the operating system bootloader from a storage device into memory.**

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

**Answer:**

- **Keyboard: Allows users to input text, numbers, and commands via keys.**

- Mouse: A pointing device used to move the cursor, select items, and interact with graphical interfaces.

- Scanner: Converts physical documents or images into digital form for editing or storage.

#### Section 4: Practical Application

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

(Since a drawn diagram cannot be physically labelled here, below is a textual description of where to find and label each component on a typical ATX motherboard.)

- CPU: Located inside the large square socket near the top-center of the motherboard; usually covered by a retention bracket or socket.

- RAM slots: Long, narrow slots near the CPU socket, often in pairs or four DIMM slots aligned vertically.

- SATA connectors: Small right-angled or vertical ports typically along the edge of the motherboard for SATA cables (label near bottom-right area).

- PCI-E slot: Long expansion slot (x16) typically located below the CPU for GPU installation; shorter PCIe x1 slots may be found above or below it.

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

Step-by-step:

1. Turn off the computer and unplug it from power.

2. Open the computer case (remove side panel).

3. Ground yourself (touch metal chassis or use anti-static wrist strap).

4. Locate RAM slots on the motherboard (next to the CPU).

5. If a slot clip is closed, open the clips on both ends.

6. Align the RAM module with the slot by matching the notch on the module to the key in the slot.

7. Insert the RAM module straight down with even pressure until the clips snap and lock.

8. Replace the case panel, reconnect power and peripherals, then boot and check BIOS/OS to confirm recognition.

#### Section 5: Essay

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

**Answer:**

**Proper cooling is essential to keep processor and other components within safe temperature ranges, which preserves performance and prevents thermal throttling or permanent damage.**

**Overheating can cause system instability, crashes, and reduced component lifespan.**

Importance:

- Maintains System Stability: Prevents unexpected shutdowns during heavy workloads.

- Prevents Thermal Throttling: Ensures CPU/GPU can maintain clock speeds without automatic downclocking.

- Increases Hardware Longevity: Reduces thermal stress on components.

Common Cooling Methods:

- Air Cooling: Uses heatsinks and fans to remove heat from components. Cost-effective and adequate for many systems. Example: CPU air coolers like Cooler Master Hyper 212.

- Liquid Cooling (AIO or custom loops): Uses a pump and radiator to transfer heat away efficiently. More effective and quieter under load; ideal for high-performance systems and overclocking.

- Thermal Paste: Applied between CPU/GPU and heatsink to fill microscopic gaps and improve thermal conductivity.

- Passive Cooling: Heatsinks without fans; silent but only effective for low-power devices.

- Case Airflow: Proper intake and exhaust fans, cable management, and dust filters help maintain

consistent airflow and cooling efficiency.

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

**Answer:**

**Bus width refers to the number of parallel data lines in a bus, typically measured in bits (e.g., 8-bit, 16-bit, 32-bit, 64-bit). It determines how many bits can be transferred simultaneously between components (CPU, memory, peripherals). Wider buses can transfer more data per clock cycle, increasing throughput. For example, a 64-bit data bus can move twice as much data as a 32-bit bus in the same cycle, improving overall system performance. Bus width also affects address bus (which determines the maximum addressable memory) and has implications for software and hardware compatibility.**

End of Assignment.