**ASSIGNMENT – 1:**

**Understanding of Hardware and its Components**

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| **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**: RAM (Random Access Memory) temporarily stores data and instructions for quick access by the CPU, enabling efficient multitasking and faster processing.

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

**1. HDD**

**2. SSD**

**3. SD card**

**4. 1 and 2 both**

**Answer**: none of the above (RAM)

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

**Answer**: A GPU (Graphics Processing Unit) accelerates rendering of images, videos, and 3D graphics. It is essential for tasks like gaming, video editing, and machine learning.

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| **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

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| **SECTION 3: SHORT ANSWER** |

**8.** **Explain the difference between HDD and SSD.**

* **Answer:**

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| **HDD (Hard Disk Drive)** | **SSD (Solid State Drive)** |
| * Uses magnetic spinning disks for data storage. * It is less expensive but slower. * High power consumption. | * Uses flash memory with no moving parts. * It offers faster speeds but expensive than HDD. * Lower power consumption. |

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

* **Answer:** BIOS (Basic Input/output System) initializes the computer's hardware during start-up, performs a POST (Power-On Self-Test), and loads the operating system by managing the boot loader.

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

* **Answer:**
  + **Keyboard:** Used to input text, commands, and shortcuts into the computer.
  + **Microphone:** Captures sound waves and can be used for voice notes or voice recognition.
  + **Scanner:** Digitizes physical documents or images for digital use and storage.

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| **SECTION 4: PRACTICAL APPLICATION** |

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

* **Answer:**
* **CPU:** Central Processing Unit socket, typically located on top of the motherboard in a computer, usually in the centre of the system. It's placed into a socket on the motherboard with the pins facing down, and secured by a lever.
* **RAM Slots:** Long vertical slots next to the CPU socket for memory modules.
* **SATA Connectors:** Small ports near the edge for connecting storage devices like HDDs and SSDs. they are usually labelled with numbers like "SATA 1", "SATA 2", etc., to identify which port is which on the motherboard.
* **PCI-E Slot:** Large horizontal slots near the CPU socket for expansion cards such as GPUs. They are often color-coded or labelled according to their size (x1, x4, x8, x16).

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

* **Answer:**
  + **Power off and unplug:** Completely shut down your computer and disconnect it from the power source.
  + **Open the computer case:** Remove screws and open the computer case to access the motherboard.
  + **Identify the slots:** On the motherboard, locate the RAM slots, which are long, narrow openings with clips on either side.
  + **Check compatibility:** Verify that the new RAM module is compatible with your motherboard specifications.
  + **Align the notch:** Hold the RAM module with the notch facing the correct direction, aligning it with the corresponding ridge on the RAM slot.
  + **Insert the module:** Gently press the RAM module into the slot, applying even pressure until the clips on either side snap into place.

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| **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 mechanisms are critical in a computer system as they prevent overheating, which can significantly impact performance, stability, and even the lifespan of hardware components like the CPU and GPU. When a computer gets too hot, it can throttle its performance to protect itself, leading to slowdowns, crashes, or even permanent damage.
  + Key reasons why cooling is important:
    - Maintaining optimal performance
    - Preventing hardware failure
    - Improving system longevity
  + Cooling methods :
    - **Passive cooling:** Utilizes heat sinks, which are metal fins designed to dissipate heat through natural convection. This is often used for low-power components.
    - **Active air cooling:** Uses fans to actively move air over heat sinks, providing more efficient heat dissipation. This is the most common cooling method for CPUs and GPUs in standard desktop computers.
    - **Liquid cooling loops:** A closed loop system where a coolant liquid circulates through a water block on the component, absorbing heat, and then transfers it to a radiator where fans cool it down. This is often used for high-performance systems due to its superior heat transfer capabilities.

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

* **Answer:**
  + The width of a bus is the number of bits (electrical wires) that the bus can carry at a time. Each line carries one bit at a time.
  + A wider bus width means faster data flow and better system performance. A computer with a higher number of buses can also carry more data for increased performance.
  + **Data Transfer Speed**:
    - A wider bus can transfer more data per clock cycle.
    - For instance, a 64-bit data bus can transfer 8 bytes at a time, whereas a 32-bit bus can only transfer 4 bytes.
  + **System Performance**:
    - Increased bus width reduces the number of cycles needed to transfer large data sets, improving overall system efficiency.
    - This is especially important in data-intensive tasks like video editing, gaming, and scientific computations.
  + **Memory Addressing**:
    - The width of the address bus determines how much memory the processor can address directly.
    - For example, a 32-bit address bus can address **232** memory locations (4 GB), while a 64-bit address bus can address **264** memory locations (16 Exabyte).