**Section 1: Multiple Choice**

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



* 1. CU
  2. 1 and 3 both

1. What is the function of RAM in a computer?   
     
   **RAM temporarily stores data and instructions that the CPU needs to access quickly while running programs. It allows for faster read and write operations compared to other storage types, making it essential for efficient multitasking.**
2. Which of the following is a primary storage device?
   1. HDD
   2. SSD
   3. SD card
   4. 1 and 2 both



1. What is the purpose of a GPU?   
     
   **A GPU (Graphics Processing Unit) accelerates the rendering of images, videos, and 3D graphics. It is essential for tasks such as gaming, video editing, and running AI/machine learning algorithms. It offloads these tasks from the CPU, enhancing overall performance.**

**Section 2: True or False**

1. True or False: The motherboard is the main circuit board of a computer where other components are attached.   
     
   **True because The motherboard serves as the central hub where components like the CPU, RAM, GPU, and storage devices are connected, facilitating communication between them.**
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.   
     
   **Ture because a UPS provides backup power in case of an outage and often includes surge protection to safeguard devices from power spikes.**
3. True or False: An expansion card is a circuit board that enhances the functionality of a component.   
     
   **True because expansion cards (e.g., graphics cards, sound cards, network cards) are installed in the motherboard to improve or add functionality to the computer system.**

**Section 3: Short Answer**

1. Explain the difference between HDD and SSD.   
    **Uses spinning magnetic disks to read and write data.**

**Slower data access speeds due to mechanical components.**

**Typically more affordable and available in higher storage capacities.**

**More prone to physical damage due to moving parts.**

**SSD (Solid State Drive):**

**Uses flash memory with no moving parts.**

**Significantly faster data access speeds and improved system performance.**

**Generally more expensive per GB but more durable and energy-efficient.**

**Lighter and more compact, suitable for modern devices like laptops.**

1. Describe the function of BIOS in a computer system.   
    **The BIOS (Basic Input/Output System) is firmware stored on a chip on the motherboard. Its functions include:**

**Performing the POST (Power-On Self-Test) to check hardware components during startup.**

**Loading the bootloader or operating system from storage into memory.**

**Providing a user interface to configure hardware settings (e.g., boot order, clock settings).**

**Acting as an intermediary between the operating system and hardware components.**

1. List and briefly explain three input devices commonly used with computers.   
     
   **1. Keyboard:**

**Used to input text, numbers, and commands into a computer. It has keys for letters, numbers, symbols, and functions.**

**2. Mouse:**

**A pointing device used to interact with graphical user interfaces, allowing users to select, drag, and drop items.**

**3. Scanner:**

**Converts physical documents or images into digital formats for storage, editing, or sharing on a computer.**

**Section 4: Practical Application**

1. Identify and label the following components on a diagram of a motherboard:
   * CPU
   * RAM slots
   * SATA connectors

* + PCI-E slot   
      
    **1. CPU (Central Processing Unit):  
      
    Located at the center of the motherboard.**

**Covered by a square CPU socket, often surrounded by a heat sink or fan.**

**2. RAM Slots (Memory Slots):**

**Positioned close to the CPU.**

**Long, narrow slots aligned vertically or horizontally for inserting RAM sticks.  
  
3. SATA Connectors:**

**Located near the edges of the motherboard.**

**Small, L-shaped ports used for connecting storage devices like HDDs and SSDs.**

**4. PCI-E Slot (Peripheral Component Interconnect Express):**

**Long slots typically located below the CPU area.**

**Used to install expansion cards like GPUs, sound cards, or network cards.**

Demonstrate how to install a RAM module into a computer.   
  
**Steps to Install a RAM Module:**

**1. Power Off and Unplug the Computer:**

**Shut down the computer and disconnect it from the power source.**

**2. Open the Computer Case:**

**Remove the side panel of the case, typically secured with screws or clips.**

**3. Locate the RAM Slots:**

**Find the RAM slots on the motherboard. These are long, narrow slots nearthe CPU, often labeled DIMM or Memory.**

**4. Prepare the RAM Module:**

**Ensure the RAM is compatible with your motherboard (check the type,speed, and capacity).**

**5. Insert the RAM Module:**

**Open the retention clips on both sides of the RAM slot.**

**7. Verify the Installation:**

**Check that the module is level and fully seated in the slot.**

**8. Close the Computer Case:**

**Reattach the side panel and secure it with screws or clips.**

**9. Reconnect and Power On:**

**Plug in the computer and power it on.**

**10. Check the RAM in the System Settings:**

**Open the BIOS or operating system to verify that the RAM is recognized and functioning correctly.**

**Section 5: Essay**

Discuss the importance of proper cooling mechanisms in a computer system. Include examples of cooling methods and their effectiveness.   
  
**Proper cooling is essential for maintaining the efficiency, performance, and longevity of a computer system. Overheating can lead to:**

**Reduced Performance: Components like the CPU and GPU may throttle their performance to lower heat output.**

**Hardware Damage: Prolonged overheating can damage sensitive components.**

**System Instability: Overheating can cause crashes, shutdowns, or data loss.**

**1. Air Cooling:**

**Components: Fans and heat sinks.**

**Effectiveness: Affordable and sufficient for general use, but may strugglewith high-performance systems or overclocking.**

**2. Liquid Cooling:**

**Components: Pump, radiator, and liquid coolant.**

**Effectiveness: More efficient at heat dissipation, quieter, and ideal for gaming PCs or workstations, though costlier.**

**3. Thermal Paste:**

**Role: Applied between the CPU and heat sink to enhance heat transfer.  
  
Effectiveness: Improves the efficiency of cooling systems.**

**4. Passive Cooling:**

**Components: Large heat sinks without fans.**

**Effectiveness: Silent but less efficient, suitable for low-power devices.**

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

**Bus Width:**

**Refers to the number of bits that can be transmitted simultaneously through the computer's data bus. The bus acts as a communication pathway between components such as the CPU, memory, and storage.**

**Significance in Computer Architecture:**

**1. Data Transfer Speed:**

**A wider bus width allows more data to be transferred in a single cycle, increasing overall speed. For example, a 64-bit bus can transfer twice as much data as a 32-bit bus.**

**2. System Performance:**

**Wider buses improve the bandwidth between the CPU and memory, reducing bottlenecks in data flow.**

**3. Compatibility with CPUs and Applications:**

**Modern processors and operating systems use 64-bit architectures, enabling them to handle larger data sizes and memory addresses efficiently.**