Module 1 : Understanding Of Hardware and Its Components

Section 1 : Multiple Choise

1. **Which of the following is not a component of CPU ?**
   1. ALU
   2. RAM
   3. CU
   4. 1 and 3 both

   Ans : 2. RAM

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

   Ans : RAM is the main memory of the computer.

   - Stores data and instruction temporarily
   - Provides fast read and write access
   - It is volatile memory

3. **Which of the following is a primary storage device ?**
   1. HDD
   2. SSD
   3. SD card
   4. 1 and 2 both

   Ans : None of these

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

Ans : GPU is a specialized processor designed to handle tasks that require lots of parallel calculation , mainly related to graphics and visual output.

1. Rendering Graphics
2. Offloading Work from CPU
3. Parallel Processing
4. Improved Performance

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 (Hard Disk Drive)	SSD (Solid State Drive)
Technology	Mechanical (spinning disks + read/write head)	Electronic (flash memory, no moving parts)
Speed	Slower (50–150 MB/s)	Much faster (500 MB/s to several GB/s)
Durability	Fragile (easily damaged if dropped)	Durable (resists shock & drops)
Noise	Noisy (spinning sound)	Silent
Heat	Produces more heat (moving parts)	Produces less heat
Lifespan	Longer in terms of write cycles	Limited write cycles (but still lasts years)
Cost per GB	Cheaper	More expensive
Storage Capacity	Usually larger (up to 20TB+)	Smaller (commonly up to 4TB–8TB)
Best Use	Bulk storage (movies, backups, files)	Operating system, apps, gaming, fast performance

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

Ans : Functions of BIOS

1. Power-on Self-Test: Checks if hardware components are working properly Before loading the operating system.
2. Boot loader : Finds and loads the operating system into memory so the computer Can start.

3. Hardware Initialization : Initializes and manages communication between hardware components during startup.
4. BIOS setup utility : Configure system settings.
5. Acts as a Bridge : Provide the interface between the operating system and hardware.

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

Ans : 1. Keyboard :

- Function : Used to enter text , numbers and commands into the computers.
- Example : Typing document , entering passwords and giving shortcut commands.

2. Mouse :

- Function : A pointing device that controls the movement of the cursor on the screen.
- Example : Clicking icons , dragging files and selecting text.

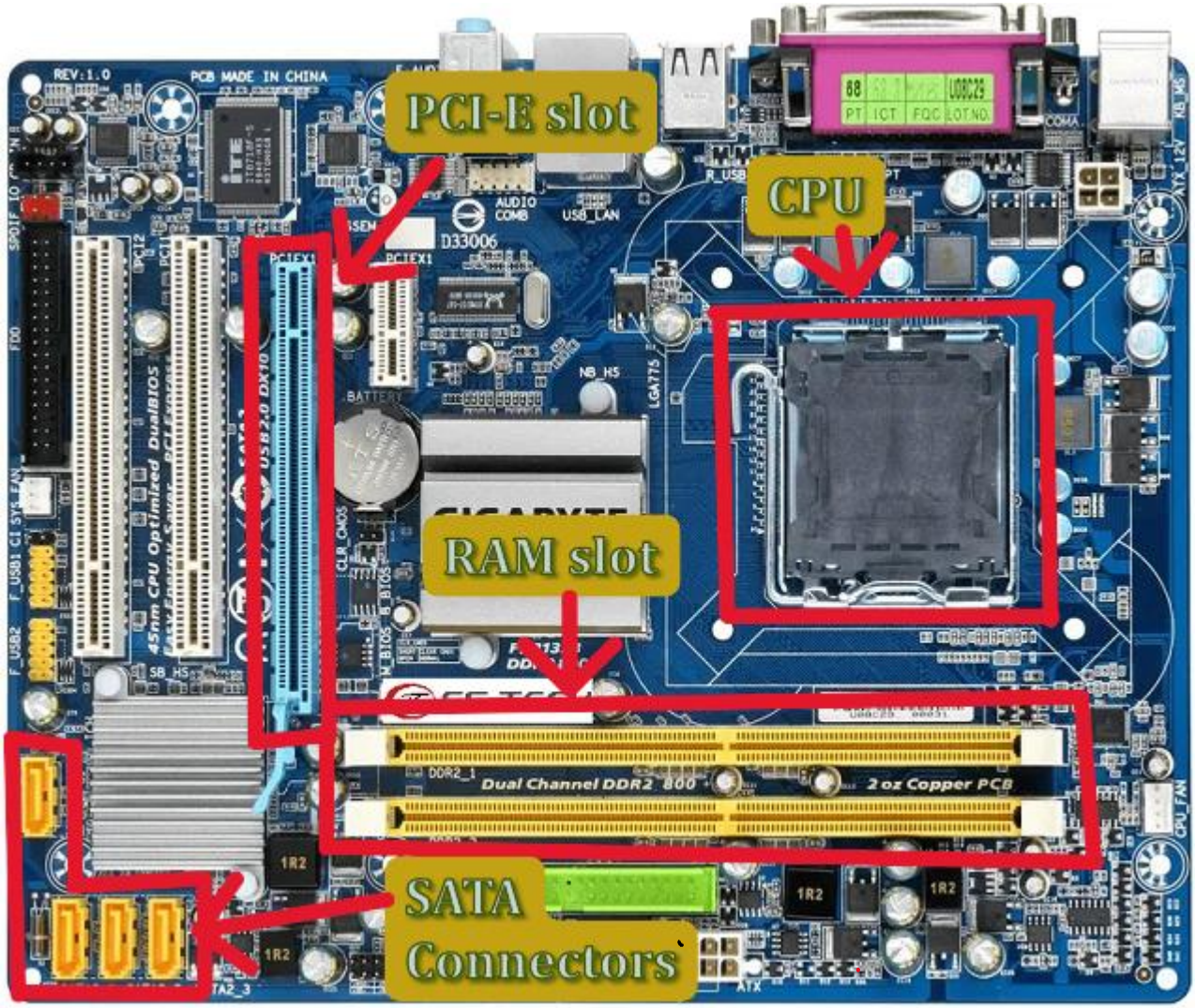
3. Scanner :

- Function : Captures the images , printed text or drawing and converts them into a digital format.
- Example : Scanning documents , photos or ID cards into the computer.

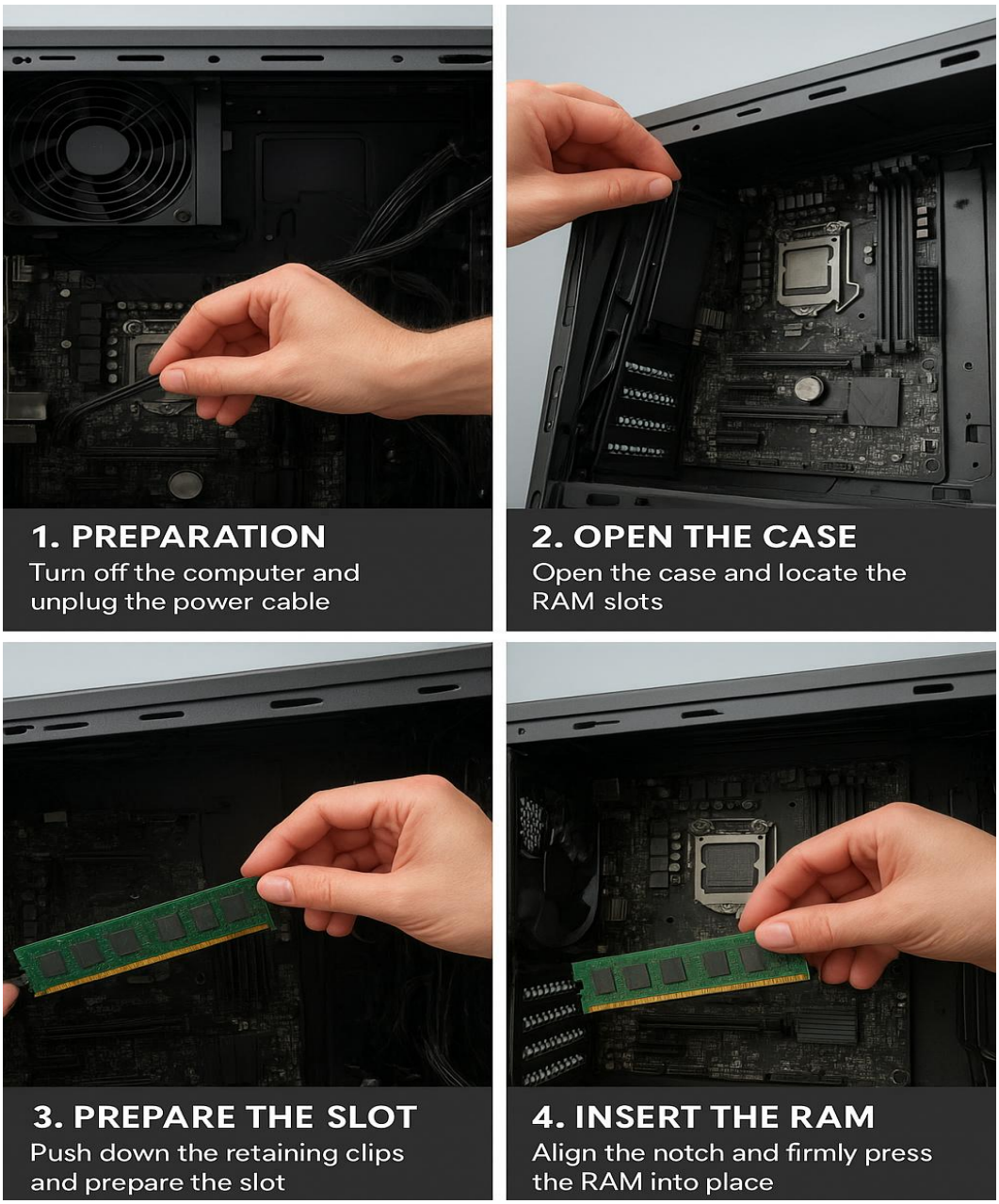
Section 4: Practical Application

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

- **CPU**
- **RAM slots**
- **SATA connectors**
- **PCI-E slot**


PCI-E slot
CPU
RAM slot
SATA
Connectors
REV:1.0
PCB MADE IN CHINA
AUDIO
COMB
USB_LAN
D33006
PCIEX1
BATTERY
NB_HS
LGA775
CLR_CMOS
B_BIOS
M_BIOS
SB_HS
DDR2_1
Dual Channel DDR2 800
2 oz Copper PCB
1R2
CPU_FAN
ATX
SPDIF_IO
FDD
F_USB1
F_USB2
CI
SYS_FAN
KB_MS
COMA

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



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 in a Computer System

A computer generates heat during operation, especially from key components like the CPU, GPU, RAM, power supply, and motherboard chipset. If heat is not properly managed:

- Components can overheat and throttle performance.
- Prolonged overheating can cause hardware damage or reduce lifespan.
- It can lead to system instability (crashes, freezes, unexpected shutdowns).

Thus, effective cooling ensures:

- Stable performance (no thermal throttling).
- Longer component lifespan.
- Safe operation of the system.

➢ **Cooling Methods and Their Effectiveness :**

1. Air Cooling (Fans and Heatsinks)

- **How it works:** Uses fans to circulate air inside the case; heatsinks absorb and dissipate heat.
- **Effectiveness:**
    - Cost-effective and easy to install.
    - Sufficient for general use, gaming PCs, and mid-range systems.
    - Effectiveness depends on airflow design and quality of fans.

2. Liquid Cooling (Closed-loop or Custom Loop)

- **How it works:** Uses liquid coolant to transfer heat from components (like CPU/GPU) to a radiator, where fans dissipate it.
- **Effectiveness:**
    - More efficient than air cooling for high-performance systems.
    - Quieter operation since fans can spin slower.
    - Common in gaming rigs, servers, and workstations with heavy workloads.
    - More expensive and requires careful installation/maintenance.

3. Thermal Paste

- **How it works:** Applied between the CPU/GPU and heatsink to improve heat transfer.

- **Effectiveness:**
    - Essential for effective cooling — prevents air gaps.
    - Needs reapplication over time (as it can dry out).

4. Case Ventilation (Airflow Management)

- **How it works:** Proper arrangement of intake and exhaust fans to optimize airflow.
- **Effectiveness:**
    - Prevents hot air buildup inside the case.
    - Simple but highly effective when combined with good cable management.

5. Advanced Cooling (Specialized)

- **Phase-Change Cooling:** Similar to refrigeration; extreme cooling for overclocking. Very effective but expensive.
- **Liquid Nitrogen (LN2):** Used in competitive overclocking; not practical for daily use.

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

Ans: A bus in computer architecture is like a highway that carries data between different parts of the computer (CPU, memory, input/output devices).

- Bus width means how many bits of data can travel across this highway at the same time.
- It is measured in bits (e.g., 8-bit, 16-bit, 32-bit, 64-bit).

Think of it like the number of lanes on a highway:

- A wider bus (more lanes) can carry more cars (data) at once.
- A narrower bus (fewer lanes) moves fewer cars, so traffic slows down.

➢ **Types of Buses**

1. **Data Bus** – carries actual data.
2. **Address Bus** – carries memory addresses (tells the CPU *where* to find data).
3. **Control Bus** – carries control signals (instructions like *read*, *write*, *halt*).

➢ **Why Bus Width is Important**

1. **Data Transfer Speed**
    - Wider bus = more data moved per clock cycle.

- Example: A **32-bit bus** moves 32 bits (4 bytes) at once; a **64-bit bus** moves 64 bits (8 bytes) at once.

2. **Memory Access**
   - Address bus width decides how much memory the CPU can directly address.
   - Example:
     - **32-bit address bus** → can address up to 4 GB of memory.
     - **64-bit address bus** → can address much, much more (theoretically 16 exabytes, though actual systems support less).
3. **System Performance**
   - A wider bus means faster communication between CPU, RAM, and other components, improving overall performance.