Module 2(Hardware): Hardware and Components basics Understanding of Hardware and its components

Section 1: Multiple Choice

1. Which of the following precautions should be taken before working on computer hardware?

Ans – (b) Wear an anti-static wrist strap to prevent damage from electrostatic discharge.

1. What is the purpose of thermal paste during CPU installation?

Ans – (c) To improve thermal conductivity between the CPU and the heat sink.

1. Which tool is used to measure the output voltage of a power supply unit(PSU)?

Ans – (a) Multimeter

1. Which component is responsible for storing BIOS settings, such as date and time, even when the computer is powered off?

Ans – (a) CMOS battery

Section 2: True or False

1. True or False: When installing a new hard drive, it is essential to format it before use.

Ans – True

1. True or False: A POST (Power-on self-Test) error indicates a problem with the CPU.

Ans – False

1. True or False: It is safe to remove a USB flash drive from a computer without ejecting it first.

Ans – False

Section 3: Short Answer

1. Describe the steps involved in installing a new graphics card in a desktop computer.

Ans – There are some steps of involved in installing a new graphics card in a desktop computer are as follow :

1. Power Down and Unplug the Computer.
2. Discharge Static Electricity.
3. Open the Computer Case.
4. Locate the PCI Express Slot
5. Remove the Slot Cover
6. Insert the Graphics Card
7. Secure the Card
8. Connect Power Cables
9. Close the Case and Reconnect Everything
10. Power On and Install Drivers
11. Test the Installation

1. What is RAID, and what are some common RAID configurations?

Ans - **RAID** stands for **Redundant Array of Independent (or Inexpensive) Disks**.  
It is a **data storage technology** that combines multiple physical hard drives into a single logical unit for the purposes of:

* **Improved performance**
* **Increased storage capacity**
* **Data redundancy (fault tolerance)**

RAID can be implemented via **hardware (RAID controller)** or **software (OS-based or software RAID).**

**🔁 Common RAID Configurations:**

**1. RAID 0 – Striping**

* **Performance:** High
* **Redundancy:** None
* **Drives Required:** Minimum 2
* **How it works:** Data is split across multiple disks for faster read/write.
* **Downside:** If one drive fails, all data is lost.

**2. RAID 1 – Mirroring**

* **Performance:** Moderate
* **Redundancy:** High
* **Drives Required:** Minimum 2
* **How it works:** Data is duplicated (mirrored) on two drives.
* **Downside:** Only 50% of the total storage is usable.

**3. RAID 5 – Striping with Parity**

* **Performance:** Good (especially for reading)
* **Redundancy:** Good
* **Drives Required:** Minimum 3
* **How it works:** Data and parity (recovery info) are distributed across all drives.
* **Downside:** Rebuild time can be slow; performance hit during write operations.

**4. RAID 10 (1+0) – Mirroring + Striping**

* **Performance:** Very High
* **Redundancy:** High
* **Drives Required:** Minimum 4
* **How it works:** Combines RAID 1 and RAID 0—mirrored pairs are striped.
* **Downside:** Only 50% of total storage is usable.

**Other RAID Types (less common):**

* **RAID 2, 3, 4:** Rarely used.
* **RAID 6:** Like RAID 5, but with dual parity; can survive two disk failures.

**🧠 Summary Table:**

| **RAID Level** | **Min Drives** | **Redundancy** | **Performance** | **Usable Space** | **Notes** |
| --- | --- | --- | --- | --- | --- |
| RAID 0 | 2 | ❌ None | 🚀 High | 100% | No fault tolerance |
| RAID 1 | 2 | ✅ Yes | 📈 Moderate | 50% | Good for critical data |
| RAID 5 | 3 | ✅ Yes | 👍 Good | N-1 drives | Balanced performance & redundancy |
| RAID 10 | 4 | ✅ Yes | 🚀 Very High | 50% | High performance and fault tolerance |

Section 4: Practical Application

1. Demonstrate how to replace a CPU fan in a desktop computer.

Ans – There are some step to replace a CPU fan in a desktop computer are as follow:

1. Power Down and Unplug.
2. Open the Case
3. Ground Yourself
4. Disconnect the Old CPU Fan
5. Remove the Old Fan/Heatsink
6. Clean the CPU Surface
7. Apply New Thermal Paste
8. Install the New CPU Fan
9. Plug in the Fan
10. Close the Case and Power On