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**Assignment module 2 : Installation and Maintenance of Hardware and Its**

* **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.

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

ANS :c) To improve thermal conductivity between the CPU and the heat sink.

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

ANS :a) Multimeter

**4**. **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**

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

ANS : **True**

Reason: A new hard drive must be partitioned and formatted so the operating system can store and retrieve data.

6. True or False: A POST (Power-On Self-Test) error indicates a problem with the CPU.

ANS : **False**

Reason : A POST error can mean problems with **RAM, GPU, motherboard, or other hardware** (not always CPU).

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

**False**

Reason: You should eject it first; otherwise, you risk **data corruption or loss** if files are still being written.

* **Section 3: Short Answer**

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

**Steps to Install a Graphics Card**

1. **Power Down and Unplug**
   * Shut down the computer completely.
   * Disconnect the power cable and all connected peripherals.
2. **Open the Computer Case**
   * Remove the screws or press the latches holding the side panel.
   * Place the case on a flat, non-carpeted surface.
3. **Discharge Static Electricity**
   * Wear an **anti-static wrist strap** or touch a grounded metal part of the case to avoid electrostatic discharge (ESD).
4. **Locate the PCI Express (PCIe x16) Slot**
   * This is usually the longest slot on the motherboard, meant for GPUs.
5. **Remove the Expansion Slot Cover**
   * Unscrew and take out the metal bracket at the back of the case where the card’s output ports will be exposed.
6. **Insert the Graphics Card**
   * Hold the GPU by its edges.
   * Align the gold connector with the PCIe slot.
   * Press down firmly until it clicks into place.
7. **Secure the Card**
   * Use screws (or a latch in some cases) to secure the GPU bracket to the case.
8. **Connect Power Cables (if needed)**
   * Many modern GPUs require 6-pin, 8-pin, or multiple PCIe power connectors from the PSU.
   * Plug them in firmly.
9. **Close the Case and Reconnect Cables**
   * Replace the side panel and tighten screws.
   * Reconnect monitor, keyboard, mouse, and power cable.
10. **Boot the Computer**
    * Power on the system.
    * Connect the monitor to the **graphics card’s output ports** (not the motherboard).
11. **Install/Update Drivers**
    * Download the latest drivers from the GPU manufacturer’s website (NVIDIA, AMD, or Intel).
    * Install and restart the system.

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

ANS : **RAID (Redundant Array of Independent/Inexpensive Disks)** is a storage technology that combines multiple physical hard drives (or SSDs) into one logical unit to improve **performance, reliability, or both**.

It is often used in servers, workstations, and systems where **data redundancy** or **speed** is important.

Common RAID Configurations

 **RAID 0 (Striping)**

* Data is split across multiple drives.
* High performance (faster read/write).
* No redundancy – if one drive fails, all data is lost.

 **RAID 1 (Mirroring)**

* Data is duplicated across two drives.
* Excellent redundancy (if one drive fails, data is safe).
* Storage capacity is halved (two 1TB drives = 1TB usable).

 **RAID 5 (Striping with Parity)**

* Requires at least 3 drives.
* Data + parity (error correction) spread across drives.
* Balance of speed, storage efficiency, and fault tolerance.
* If more than one drive fails, data is lost.

 **RAID 6 (Striping with Double Parity)**

* Requires at least 4 drives.
* Can survive **two drive failures**.
* Better fault tolerance than RAID 5.
* Slightly slower writes due to double parity calculations.

 **RAID 10 (1+0, Mirroring + Striping)**

* Combines RAID 1 and RAID 0.
* High speed **and** redundancy.
* Needs at least 4 drives, costly in terms of storage efficiency.
* **Section 4: Practical Application**

**1. Prepare the Workspace**

* Shut down the computer and unplug the power cable.
* Disconnect all peripherals.
* Place the PC on a flat, non-carpeted surface.
* Wear an **anti-static wrist strap** or touch the case to discharge static electricity.

**2. Open the Case**

* Remove the side panel of the case (usually secured with screws or latches).
* Locate the CPU and its cooling fan on the motherboard.

**3. Disconnect the Old Fan**

* Follow the cable from the CPU fan to the **CPU\_FAN header** on the motherboard.
* Gently unplug it.

**4. Remove the Heat Sink and Fan Assembly**

* Depending on the cooler type:
  + **Clips/Push Pins** → Release them carefully.
  + **Screws** → Unscrew evenly in a diagonal pattern.
* Lift the cooler straight up (if stuck, twist gently).

**5. Clean the CPU Surface**

* Use **isopropyl alcohol (90% or higher)** and a lint-free cloth or thermal wipe.
* Remove old thermal paste from the CPU and the base of the cooler.
* Ensure both surfaces are clean and dry.

**6. Apply New Thermal Paste**

* Put a small pea-sized drop in the center of the CPU.
* This helps ensure good thermal conductivity between CPU and cooler.

**7. Install the New Fan and Heat Sink**

* Position the new CPU fan/cooler over the CPU.
* Align mounting brackets or screws.
* Secure it firmly (but not overly tight) in a cross pattern to ensure even pressure.

**8. Connect the New Fan**

* Plug the fan cable into the **CPU\_FAN header** on the motherboard.

**9. Reassemble the Case**

* Reattach the side panel.
* Reconnect all cables and peripherals.

**10. Test the System**

* Power on the PC.
* Enter BIOS (optional) to check CPU temperatures and confirm the new fan is detected.
* Make sure the fan is spinning normally.
* **Section 5: Essay**

**11. Discuss the importance of regular maintenance for computer hardware and provide examples of maintenance tasks.**

**Importance of Regular Maintenance for Computer Hardware**

Regular maintenance is essential to ensure that a computer system runs **efficiently, reliably, and securely**. Without proper care, hardware can suffer from **dust buildup, overheating, reduced performance, or unexpected failures**. Preventive maintenance helps extend the **lifespan of components**, reduces downtime, and saves money on costly repairs.

**Examples of Hardware Maintenance Tasks**

**🔹 Cleaning**

* Remove **dust** from fans, heat sinks, and vents using compressed air.
* Clean keyboard, mouse, and monitor to maintain hygiene and usability.

**🔹 Cooling & Ventilation**

* Check and replace **thermal paste** if CPU temps rise.
* Ensure fans are working properly and airflow inside the case is clear.

**🔹 Hardware Checks**

* Inspect cables and connections for wear or looseness.
* Test **PSU output** with a multimeter if issues arise.

**🔹 Storage & Memory**

* Check hard drives/SSDs for errors using built-in tools (e.g., CHKDSK, SMART status).
* Defragment HDDs (not needed for SSDs).

**🔹 Updates & Security**

* Update BIOS/firmware when required.
* Keep antivirus and system patches up to date (software + hardware balance).

**🔹 Backup**

* Regularly back up important data to external drives or cloud storage.