Assignment 2 : ﻿Installation and maintenance of hardware and its components..﻿SECTION 1 : Multiple choice questions .﻿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) Multimeter﻿4) Which component is responsible for storing BIOS settings, such as date ﻿and time, even when the computer is powered off?﻿ANS : a) CMOS battery﻿SECTION 2 : True and false.﻿5. True or False: When installing a new hard drive, it is essential to format ﻿it before use.﻿ANS : True ﻿6. True or False: A POST (Power-On Self-Test) error indicates a problem ﻿with the CPU.﻿ANS : False ﻿7. 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.﻿8. Describe the steps involved in installing a new graphics card in a ﻿desktop computer.﻿ANS : Steps for installing a new graphics card:﻿     \* Power down and unplug: Turn off the computer and unplug it from the power source.﻿     \* Open the case: Remove the side panel of the computer case.﻿     \* Locate PCIe slot: Identify an available PCIe x16 slot on the motherboard (usually the longest slot).﻿     \* Remove old card (if any): If replacing an old card, unscrew it from the back of the case and gently unclip it from the PCIe slot, then carefully pull it out.﻿     \* Remove expansion slot cover: Remove the metal bracket cover corresponding to the PCIe slot at the back of the case.﻿     \* Insert new card: Align the new graphics card with the PCIe slot and press it firmly until it clicks into place. Ensure the locking tab on the slot engages.﻿     \* Secure the card: Screw the graphics card into the case bracket to secure it.﻿     \* Connect power (if needed): If the graphics card requires auxiliary power, connect the appropriate PCIe power cables from the power supply to the card.﻿     \* Close the case and power on: Replace the side panel, plug in the power, and connect the display cable to the new graphics card.﻿     \* Install drivers: Boot the computer and install the latest drivers for the new graphics card from the manufacturer's website.﻿9. What is RAID, and what are some common RAID configurations?﻿ANS : RAID (Redundant Array of Independent Disks) is a data storage virtualization technology that combines multiple physical disk drive components into one or more logical units for the purposes of data redundancy, performance improvement, or both.﻿   \* Common RAID configurations:﻿     \* RAID 0 (Stripping): Data is split into blocks and written across multiple drives. Offers improved performance but no data redundancy (if one drive fails, all data is lost).﻿     \* RAID 1 (Mirroring): Data is duplicated on two or more drives. Provides excellent data redundancy (if one drive fails, the data is still available on the mirrored drive) but reduces usable storage space by half.﻿     \* RAID 5 (Stripping with Parity): Data is striped across multiple drives, and parity information is distributed among them. Offers a good balance of performance, redundancy (can withstand one drive failure), and storage efficiency. Requires at least three drives.﻿     \* RAID 10 (RAID 1+0 / Stripping of Mirrors): Combines RAID 1 (mirroring) and RAID 0 (stripping). Data is mirrored in pairs, and then these mirrored pairs are striped. Provides both high performance and high redundancy (can withstand multiple drive failures, as long as they are not in the same mirrored pair). Requires at least four drives.﻿SECTION 4 : Practical Application.﻿10. Demonstrate how to replace a CPU fan in a desktop computer.﻿ANS :  Preparation: Power down the computer, unplug it, and open the case. Lay the case flat.﻿     \* Disconnect fan cable: Locate the CPU fan cable connected to the motherboard (usually labeled "CPU\_FAN"). Gently unplug it.﻿     \* Remove old cooler:﻿       \* Clip-on/Lever-style: If it's a cooler with clips or levers (common for AMD), unclip or lift the levers to release tension, then gently twist and lift the heatsink.﻿       \* Push-pin style (Intel stock): For Intel push-pin coolers, gently twist each of the four push-pins 90 degrees counter-clockwise (there are arrows indicating direction), then pull them up to release. Gently twist and lift the heatsink.﻿       \* Screwed-down style: Unscrew the four screws holding the heatsink in place (often in a cross pattern).﻿     \* Clean old thermal paste: Use isopropyl alcohol and a lint-free cloth or coffee filter to carefully clean off all the old thermal paste from both the CPU's integrated heat spreader (IHS) and the base of the old heatsink (if you intend to keep it, though usually you replace the entire unit).﻿     \* Apply new thermal paste: Apply a small pea-sized or grain-of-rice-sized dot of new thermal paste to the center of the CPU's IHS. Do not spread it; the pressure from the new heatsink will spread it evenly.﻿     \* Install new cooler:﻿       \* Carefully align the new CPU cooler with the mounting holes/clips on the motherboard.﻿       \* Push-pin: If using push-pins, press each pin down firmly until it clicks, ensuring all four are securely engaged.﻿       \* Screwed: If screwing it down, start by lightly screwing in each screw in a diagonal pattern (e.g., top-left, bottom-right, top-right, bottom-left) a few turns, then tighten them incrementally in the same diagonal pattern until they are snug. Do not overtighten.﻿       \* Clip/Lever: Re-engage the clips or levers to secure the heatsink.﻿     \* Connect fan cable: Plug the new CPU fan cable into the "CPU\_FAN" header on the motherboard.﻿     \* Finalize: Close the computer case, plug it back in, and power it on. Monitor CPU temperatures to ensure proper installation.﻿SECTION 5 :  Essav .﻿11. Discuss the importance of regular maintenance for computer hardware ﻿and provide examples of maintenance tasks.﻿ANS : Importance of Regular Maintenance for Computer Hardware:﻿     Regular maintenance of computer hardware is crucial for several reasons. It extends the lifespan of components, ensures optimal performance, prevents data loss, improves system stability, and ultimately saves money on repairs or replacements. Over time, dust accumulation, thermal stress, and general wear and and tear can degrade component efficiency and lead to failures. Proactive maintenance helps to identify and address potential issues before they become critical, maintaining the system's reliability and user productivity.﻿   \* Examples of Maintenance Tasks:﻿     \* Physical Cleaning:﻿       \* Dust Removal: Regularly clean dust from inside the computer case, especially on fans (CPU, GPU, case fans), heatsinks, and vents using compressed air. Dust acts as an insulator, trapping heat and leading to overheating, which can shorten component life and cause performance throttling.﻿       \* Screen Cleaning: Clean monitors with appropriate screen cleaner and microfiber cloths to remove smudges and dust, improving visibility.﻿       \* Keyboard and Mouse Cleaning: Clean keyboards to remove dirt and crumbs stuck between keys, and clean mouse sensors for smooth operation.﻿     \* Thermal Management:﻿       \* Checking Fan Operation: Ensure all system fans (CPU, GPU, power supply, case fans) are spinning freely and not making unusual noises. Replace noisy or failing fans.﻿       \* Thermal Paste Inspection/Replacement: For enthusiast users, re-applying thermal paste on the CPU and GPU every few years can improve heat transfer efficiency, especially if temperatures start to creep up.﻿       \* Cable Management: Improve airflow inside the case by properly routing cables to prevent them from obstructing air pathways.﻿     \* Component Checks and Updates:﻿       \* Firmware Updates: Periodically check for and apply BIOS/UEFI firmware updates for the motherboard and firmware updates for other components like SSDs or network cards. These can improve compatibility, stability, and performance.﻿       \* Cable Connections: Ensure all internal and external cables (SATA, power, display, USB) are securely connected. Loose connections can lead to intermittent issues or component failure.﻿       \* Peripheral Inspection: Check external peripherals (printers, scanners, external drives) for physical damage or loose connections.﻿     \* Power Supply Health:﻿       \* Surge Protector/UPS: Use a surge protector or Uninterruptible Power Supply (UPS) to protect against power fluctuations and outages, which can damage components.﻿       \* PSU Fan Cleaning: Clean dust from the power supply unit's fan and vents.﻿     \* Battery Maintenance (Laptops/UPS):﻿       \* For laptops, avoid constantly keeping the battery at 100% or letting it fully discharge frequently.﻿       \* Check the health of UPS batteries and replace them when their capacity degrades.