**Section 1: Multiple Choice**

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

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

* + **Explanation:** Your body can build up static electricity, and touching a computer component can create a small spark that damages it. An anti-static wrist strap safely grounds you to prevent this.

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

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

* + **Explanation:** The surfaces of the CPU and its heat sink aren't perfectly flat. Thermal paste fills in the tiny air gaps between them, which helps heat move from the hot CPU to the cooler heat sink more efficiently.

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

**a) Multimeter**

* + **Explanation:** A multimeter is a device used to measure electrical values like voltage, current, and resistance. It's the right tool to check if a power supply is working correctly.

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

**a) CMOS battery**

* + **Explanation:** The CMOS battery is a small battery on the motherboard that provides power to a chip that stores the BIOS settings. This is why your computer remembers the date and time even when it's unplugged.

**Section 2: True or False**

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

**True.**

* + **Explanation:** A new hard drive is like an empty plot of land. Formatting it creates a file system (like building roads and addresses), which allows the operating system to store and find files on it.

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

**False.**

* + **Explanation:** The POST checks all the essential hardware when you turn on the computer, including RAM, the graphics card, and the keyboard. A POST error means something failed this initial check, but it isn't necessarily the CPU.

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

**False.**

* + **Explanation:** You should always use the "Eject" or "Safely Remove Hardware" option before unplugging a USB drive. If the computer is still writing data to the drive when you pull it out, you can corrupt the files and damage the drive.

**Section 3: Short Answer**

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

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

Installing a graphics card is a straightforward process.

* 1. **Power Down:** Completely shut down the computer and unplug it from the wall.
  2. **Open the Case:** Remove the side panel of the computer case to get to the internal components.
  3. **Find the Slot:** Locate the correct slot on the motherboard, which is usually the longest one, called a PCI-Express (PCIe) x16 slot.
  4. **Prepare the Slot:** Remove the small metal bracket on the back of the computer case that lines up with the PCIe slot.
  5. **Insert the Card:** Carefully align the graphics card with the slot and press down firmly until it clicks into place.
  6. **Secure the Card:** Use a screw to fasten the card's metal bracket to the computer case.
  7. **Connect Power:** If the graphics card requires extra power, connect the necessary power cables from the power supply unit (PSU).
  8. **Close Up:** Put the side panel back on the case, plug the computer back in, and connect your monitor cable to the new graphics card.

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

**RAID** stands for **Redundant Array of Independent Disks**. It's a technology that combines multiple hard drives into a single unit. This can be done to improve performance, provide data protection, or both.

Some common RAID configurations are:

* 1. **RAID 0 (Striping):** Data is split across two or more drives. This makes reading and writing files much faster but offers no protection. If one drive fails, all the data is lost.
  2. **RAID 1 (Mirroring):** Data is written to two drives at the same time, creating an exact copy or "mirror." If one drive fails, the other one has a perfect backup, so no data is lost.
  3. **RAID 5 (Striping with Parity):** This configuration needs at least three drives. It stripes data across the drives like RAID 0, but it also stores extra "parity" information. If one drive fails, this parity information can be used to rebuild the lost data. It provides a good balance of speed and protection.

**Section 4: Practical Application**

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

Replacing a CPU fan (which is usually attached to a heat sink) involves these steps:

* 1. First, power off the PC, unplug all cables, and open the computer case.
  2. Locate the CPU fan on the motherboard. It's usually a large fan attached to a metal block (the heat sink) sitting on top of the CPU.
  3. Carefully unplug the fan's power cable from the motherboard. The plug is usually labeled "CPU\_FAN".
  4. Unlock the mechanism holding the heat sink and fan assembly in place. This could be push-pins that you twist and pull up, or levers that you flip.
  5. Gently twist and lift the entire cooler off the CPU. The old thermal paste might make it a little sticky.
  6. Use a lint-free cloth and some isopropyl alcohol to clean the old, dried thermal paste off the top of the CPU.
  7. Apply a small, pea-sized dot of new thermal paste onto the center of the clean CPU.
  8. Place the new fan and heat sink on top of the CPU, making sure it sits flat.
  9. Secure the new cooler using its mounting mechanism. Make sure it's on tight and doesn't wobble.
  10. Plug the new fan's power cable into the "CPU\_FAN" header on the motherboard.
  11. Close the case, plug the computer back in, and turn it on.

**Section 5: Essay**

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

Regular maintenance of computer hardware is essential for keeping a computer running smoothly, extending its lifespan, and preventing unexpected failures. Just like a car needs regular oil changes and check-ups, a computer needs care to perform at its best. Neglecting maintenance can lead to overheating, slow performance, and costly repairs down the road.

One of the most important maintenance tasks is **keeping the computer clean**. Over time, dust and hair build up inside the computer case, clogging fans and covering components. This layer of dust acts like a blanket, trapping heat. Heat is the enemy of electronics; it can cause components to slow down to protect themselves and can eventually lead to permanent damage. A simple task like using compressed air to blow dust out of fans, vents, and heat sinks every few months can significantly improve cooling and prevent overheating.

Another key area of maintenance is ensuring **good airflow and secure connections**. This can involve organizing the cables inside the case so they don't block fans. It's also a good practice to occasionally check that all internal components, like RAM sticks and graphics cards, are seated properly in their slots, and that all power and data cables are plugged in firmly. Loose connections can cause random crashes or prevent the computer from starting up at all.

In conclusion, taking a little time for regular hardware maintenance is a wise investment. Simple tasks like cleaning out dust, managing cables, and checking connections help maintain good performance, prevent components from failing due to heat, and ensure the computer remains reliable for years to come. It’s a proactive approach that saves both money and frustration in the long term.