Module 2: Installation and Maintenance of Hardware and Its Components - Assignment

Section 1: Multiple Choice

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

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

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

Answer: 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)?

Answer: a) Multimeter

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

Answer: a) CMOS battery

Section 2: True or False

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

Answer: True

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

Answer: False

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

Answer: False

Section 3: Short Answer

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

Steps:

1. Preparation:
    - Power off the computer and unplug it from the electrical outlet
    - Press the power button to discharge residual electricity
    - Wear an anti-static wrist strap

2. Remove Old Card :
    - Open the computer case
    - Locate the existing graphics card
    - Disconnect any power cables from the card
    - Unscrew the bracket securing the card
    - Release the PCIe slot retention clip
    - Carefully remove the old card
3. Install New Card:
    - Align the new graphics card with the PCIe x16 slot
    - Firmly press down until the retention clip clicks
    - Secure the card with screws to the case bracket
    - Connect required PCIe power cables from the PSU
4. Final Steps:
    - Close the case
    - Reconnect power and peripherals
    - Power on the computer
    - Install the latest drivers from the manufacturer's website

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

RAID (Redundant Array of Independent Disks) is a technology that combines multiple hard drives into a single logical unit for data redundancy, performance improvement, or both.

Common RAID Configurations:

- **RAID 0 (Striping):**
    - Data is split across multiple drives
    - Improves performance
    - No redundancy - if one drive fails, all data is lost
    - Requires minimum 2 drives
- **RAID 1 (Mirroring):**
    - Data is duplicated on two or more drives
    - Provides redundancy

    - No performance gain for writes
    - Requires minimum 2 drives
- **RAID 5 (Striping with Parity):**
    - Data and parity information distributed across all drives
    - Can survive one drive failure
    - Good balance of performance and redundancy
    - Requires minimum 3 drives

Section 4: Practical Application

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

Step-by-Step Process:

1. **Safety Preparation:**
    - Power off and unplug the computer
    - Discharge static electricity
    - Wear anti-static wrist strap
    - Open the computer case
2. **Remove Old Fan:**
    - Disconnect the fan power cable from the motherboard (usually labeled CPU_FAN)
    - Identify the fan mounting mechanism (clips, screws, or push pins)
    - For clip mounts: gently release clips in a diagonal pattern
    - For screw mounts: unscrew in a criss-cross pattern
    - Carefully lift the heatsink/fan assembly
3. **Clean the CPU:**
    - Remove old thermal paste from CPU surface using isopropyl alcohol (90% or higher) and lint-free cloth
    - Ensure surface is completely clean and dry
4. **Install New Fan:**
    - Apply a small amount (pea-sized) of thermal paste to the center of the CPU
    - Align the new heatsink/fan assembly with mounting holes

- Secure using mounting mechanism (clips or screws in criss-cross pattern)
- Ensure even pressure on all corners

5. **Final Steps:**
    - Connect fan power cable to CPU_FAN header
    - Verify secure installation
    - Close case
    - Power on and verify fan operation in BIOS

Section 5: Essay

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

Regular hardware maintenance is crucial for ensuring optimal computer performance, extending component lifespan, and preventing costly failures.

Importance of Regular Maintenance:

1. Performance Optimization Regular maintenance prevents performance degradation caused by dust accumulation, thermal issues, and software conflicts. Clean components operate at optimal temperatures, maintaining processing speeds.

2. Extended Hardware Lifespan Proper maintenance can significantly extend the life of computer components. Keeping systems clean and cool reduces stress on electronic components, preventing premature failure.

3. Cost Savings Preventive maintenance is far less expensive than replacing failed components or recovering lost data. Regular checks can identify potential issues before they become critical.

4. Data Protection Regular backups and drive health monitoring protect against data loss from hardware failures.

Key Maintenance Tasks:

Physical Cleaning:

- Clean dust from fans, heatsinks, and air vents every 3-6 months
- Use compressed air to remove dust from internal components
- Clean monitor screens and peripherals

Thermal Management:

- Monitor CPU and GPU temperatures
- Replace thermal paste every 2-3 years
- Ensure proper airflow with correctly positioned fans
- Verify all fans are functioning properly

Storage Maintenance:

- Run disk cleanup utilities to remove temporary files
- Defragment HDDs (not SSDs) quarterly
- Check drive health using S.M.A.R.T. monitoring tools
- Verify backup systems are functioning

Software Maintenance:

- Update drivers regularly
- Update BIOS/UEFI when necessary (with caution)
- Remove unnecessary startup programs
- Run antivirus and anti-malware scans

Cable Management:

- Organize cables to improve airflow
- Check for loose connections
- Replace damaged cables

Power Supply:

- Test voltage outputs annually
- Clean dust from PSU (if design allows)
- Verify adequate wattage for components