SECTION A

1.(a) i. Explain the difference between system bus and processor.

ii. What are the measurements of frequency of a system bus and processor? Which one is faster the system bus and the processor?

The measurements of frequency for both the system bus and the processor are typically expressed in Hertz (Hz) or its multiples such as megahertz (MHz) or gigahertz (GHz)

System Bus Frequency:- represents the speed at which data is transferred between the processor, memory, and other components on the motherboard.

Processor Frequency::- represents the speed at which the processor's internal operations are executed

(b) Why do batteries and monitors need to be properly disposed off?

1. Hazardous Materials: Many batteries contain hazardous materials such as lead, mercury, cadmium, lithium, and various corrosive acids. Improper disposal can lead to these toxic substances leaching into the soil, water, and air, causing pollution and potentially harming ecosystems and human health.
2. Environmental Impact: When batteries are thrown into regular trash or end up in landfills, they can break down and release harmful chemicals over time. These chemicals can seep into the soil and contaminate groundwater or enter the atmosphere through incineration, contributing to air pollution

(c) What are the five main categories of form factors used for motherboard? What motherboard form factor is most popular?

ATX (Advanced Technology eXtended)

MicroATX (mATX)

Mini-ITX:

Extended ATX (EATX)

ITX (Information Technology eXtended)

ATX form factor remains the most popular and widely adopted. Its larger size provides room for multiple expansion slots and connectors, making it suitable for a wide range of computer builds

(d) Explain the main function of the following PC components: i. Modem ii I/O port iii Memory iv Adapter Cards

Adapter Cards: Adapter cards, also known as expansion cards or peripheral cards, are additional hardware components

. Modem: A modem (modulator-demodulator) is a hardware device used to connect a computer to the internet or other remote networks

I/O port (Input/Output port): I/O ports are physical connectors on the computer system that allow the exchange of data between the computer and external devices

(e) State the two components that make up the chipset. Briefly explain difference between those components.

> The two main components that make up the chipset are the Northbridge and the Southbridge.
>
> Northbridge: The Northbridge is a key component of the chipset that is responsible for handling the high-speed communication between the CPU and the memory subsystem
>
> Southbridge: The Southbridge is another component of the chipset that handles the input/output (I/O) functions of the computer system

(f) Which is faster SRAM or DRAM? Why?

SRAM (Static Random Access Memory) is faster than DRAM (Dynamic Random Access Memory). The primary reason for this speed difference lies in the underlying technology and structure of these two memory types.

Access Time: SRAM has a faster access time compared to DRAM

Complexity: The structure of SRAM, with its flip-flop circuits, is more complex compared to the simpler structure of DRAM. This complexity contributes to SRAM's higher speed but also results in a higher cost

Density: DRAM is more compact and has higher memory density compared to SRAM. This higher density allows for greater memory capacity at a lower cost per bit. However, this increased density comes at the expense of slower access times.

(g) Which document exhibits better quality, one printed with 600 dpi or one printed with 1200 dpi? Why?

A document printed with 1200 dpi (dots per inch) exhibits better quality compared to one printed with 600 dpi. The reason for this is the higher resolution and finer detail captured by the 1200 dpi printing.

(h) Describe a SCSI bus termination. What SCSI bus termination is necessary?

SCSI bus termination refers to the process of properly terminating the ends of a SCSI (Small Computer System Interface) bus to ensure proper signal transmission and prevent signal reflections and data corruption. Termination is necessary in SCSI systems to maintain signal integrity and reliable communication between SCSI devices

SECTION B

2.(a) Briefly explain any four of secondary storage devices

Hard Disk Drive (HDD).

Solid-State Drive (SSD): SSDs are storage devices that use flash memory to store data electronically.

Optical Disc Drive (ODD): ODDs use laser technology to read and write data on optical discs, such as CDs, DVDs, and Blu-ray discs.

USB Flash Drive:- use flash memory to store data.

(b) Explain any three components that must have the same or compatible form factor

When building a computer system, it is crucial to ensure that certain components have the same or compatible form factor to ensure proper fit and functionality. Here are three components that typically require the same or compatible form factor:

Motherboard and Computer Case

Power Supply and Computer Case

Expansion Cards and Motherboard.

(c) Explain any three steps that a technician uses to install a power supply.

Preparation and Safety Measures:

- Ensure the computer is turned off and unplugged from the power source. This prevents electrical shock and damage to components.

Removal of the Old Power Supply:

- Open the computer case by removing the screws holding the side panel. Slide or lift the panel to access the internal components.

Installation of the New Power Supply:

- Take the new power supply and align it with the mounting bracket in the case. Ensure that it fits properly and aligns with the screw holes.

(d) Suppose a CMOS battery in a computer system is died, if the user turn on the system, will you except the system to boot up normally to the operating system level? What information do you think the system would not have available for a successful boot?

- If the CMOS battery in a computer system is dead, it can lead to certain issues and may prevent the system from booting up normally to the operating system level. Here's what can happen.

- Loss of CMOS Settings, - Incorrect Date and Time, - BIOS Errors and Prompts

3.(a) Describe the methods used to monitor, power supplies and fans, removing dust and dirt from inside a computer.

Monitoring:

- Check power supply: Regularly monitor the performance of the power supply unit (PSU) to ensure it is functioning properly. Look for signs of overheating, unusual noises, or erratic behavior, which may indicate a faulty or failing PSU.

Cleaning Power Supplies and Fans:

- Shut down and unplug: Turn off the computer and unplug it from the power source before performing any cleaning tasks. This ensures safety and prevents accidental damage.

Removing Dust and Dirt from Inside the Computer:

- Open the computer case: Remove the screws or fasteners securing the computer case and carefully slide or lift off the side panel to expose the internal components.

(b) The electrical power in most of developing countries is still unstable. Explain any four solutions that might be used to protect the computer hardware such as laptops, personal computers, switches from power fluctuations.

Uninterruptible Power Supply (UPS):

- A UPS provides backup power during power outages and regulates voltage fluctuations.

oltage Regulator or Stabilizer:

- Voltage regulators or stabilizers are devices that ensure a constant and stable voltage supply to the computer

Surge Protectors:

- Surge protectors are essential for safeguarding computer hardware against sudden voltage spikes.

Automatic Voltage Regulator (AVR):

- An Automatic Voltage Regulator is another device that helps stabilize and regulate voltage levels

(c) How do you enter the into BIOS setup program?

(d) Briefly, describe any four main functions of BIOS in most personal Computers.

Power- On Self Test (POST).

-Bootstrap loader

-System configuration and setup

-Hardware interface and driver execution

4.(a) Why the volatile memory is used in most personal computers and not non volatile memory? Explain any three reasons

Speed and Performance: Volatile memory, such as Random Access Memory (RAM), offers faster read and write speeds compared to non-volatile memory.

Dynamic Data Storage: Personal computers primarily use volatile memory for storing data and instructions that need to be accessed and modified frequently during active use.

Flexibility and Accessibility: Volatile memory offers greater flexibility in terms of data storage and access.

(b) Explain six Electrophoto(EP) steps or stages to transfer an image onto paper using a laser printer

Cleaning:

- Before starting the printing process, the printer ensures that the photoreceptor drum (also known as the imaging drum) is clean and free from any residual toner or debris from previous print jobs. A cleaning mechanism, such as a cleaning blade or roller, removes any unwanted particles from the drum's surface

Charging: The next step is charging the photosensitive drum or imaging drum.

Writing: In the writing step, a laser beam is used to create an electrostatic image on the charged drum

Developing: Once the electrostatic image is formed on the drum, the developing step takes place. The developing unit contains toner, which is a fine powder composed of pigment and plastic particles. The toner is attracted to the charged areas on the drum, where the electrostatic image is present, creating a visible image on the drum's surface

Transferring: In the transferring step, the toner image on the drum is transferred to the paper

Fusing: The final step is the fusing process, where the toner is permanently bonded to the paper

(c) Assume you are a computer technician, during upgrading a memory you receives an add-on or error message, briefly explain any five approaches that can be done to rectify the problems.

Reseat the Memory Modules:

Clean the Memory Slots:

Test Memory Modules Individually:

Update or Rollback Drivers and BIOS

5. (a) Most buses are 16, 32, 64 or 128 bits wide. Explain any two reasons why buses widths are multiple of eight.

Aligning bus widths to multiples of eight bits based on byte alignment and compatibility considerations ensures efficient data transfer.

Compatibility between components, and ease of implementation in computer systems. It allows for standardized data handling and enables seamless communication between different hardware components.

(b) Processors have a specified safe temperature range that represents their limits for normal operation. If the processor overheats may result into malfunction problems. Compare and contrast any three CPU cooling mechanism

Processors have a specified safe temperature range to ensure their normal operation

and prevent overheating, which can lead to performance degradation or even damage. CPU cooling mechanisms are employed to dissipate heat and maintain the processor's temperature within the safe range. Here are three common CPU cooling mechanisms and their comparisons:

1. Air Cooling (Heatsinks and Fans):
    - Air cooling is the most widely used and cost-effective CPU cooling method. It typically involves a combination of a heatsink and a fan

Liquid Cooling:

- Liquid cooling is a more advanced cooling solution that utilizes a closed-loop system. It involves a heat exchanger, a pump, and tubes filled with a coolant liquid (usually a mix of water and additives)

Phase-Change Cooling:

- Phase-change cooling is a less common but highly efficient cooling method used mainly in extreme overclocking scenarios or specialized systems

In summary, air cooling with heatsinks and fans is the most common and cost-effective CPU cooling mechanism. Liquid cooling offers better cooling performance and quieter operation, but at a higher cost and potential maintenance requirements. Phase-change cooling provides the most efficient cooling, but it is expensive, complex, and mainly used in extreme scenarios.

(c) Describe two criteria that are used to identify form factor of a motherboard.

Physical Dimensions: The physical dimensions of a motherboard play a crucial role in determining its form factor. Different form factors have specific size requirements, which dictate the overall dimensions and shape of the motherboard. For example, ATX (Advanced Technology Extended) form factor motherboards typically measure 12 x 9.6 inches (305 x 244 mm), while microATX (mATX) motherboards are smaller, measuring 9.6 x 9.6 inches (244 x 244 mm).

Mounting Hole Placement: Another criterion for identifying the form factor of a motherboard is the placement and arrangement of mounting holes

(d) Explain the following terms i. Multiprocessing ii Multiprocessor iii Multicore processor

. Multiprocessing:

- Multiprocessing refers to the use of multiple processors or central processing units (CPUs) in a computer system to perform tasks simultaneously

Multiprocessor:

- A multiprocessor system refers to a computer system that contains multiple processors or CPUs working together as a single unit.

A multicore processor is a single integrated circuit (IC) that contains multiple independent processing cores on a single chip

(e) Explain Overclocking and Throttling in processor or motherboard. What is the disadvantages of overclocking processor or motherboard?

Overclocking: Overclocking is the process of increasing the operating frequency or clock speed of a processor or other hardware components beyond their specified limits

Throttling, on the other hand, is a mechanism employed by processors or motherboards to reduce clock speed or performance temporarily under certain conditions.

-Disadvantages of Overclocking:

1. Increased heat generation: Overclocking typically leads to an increase in power consumption and heat generation. Higher clock speeds result in greater electrical currents passing through the components, which generates more heat