Applied Short Answer

Units of Measure for Computer Memory and Storage:

1. *Byte (B)*

2. *Kilobyte (KB)*

3. *Megabyte (MB)*

4. *Gigabyte (GB)*

5. *Terabyte (TB)*

Danger:

Danger refers to a situation or condition that poses a threat to safety, health, or well-being, potentially causing harm or injury.

Environmental Hazards:

1. *Pollution* (air, water, soil)

2. *Climate Change*

3. *Toxic Waste*

4. *Deforestation*

5. *Radiation*

Types of Safety:

1. *Personal Safety*: Protects individuals from harm.

2. *Electrical Safety*: Prevents electrical shocks and hazards.

3. *Fire Safety*: Prevents fires and minimizes damage.

4. *Data Safety*: Protects sensitive information.

5. *Workplace Safety*: Ensures a safe working environment.

Surgical Diathermy:

Surgical diathermy, also known as electrosurgery, uses high-frequency electrical current to cut or coagulate tissues during surgery.

Two Main Functions:

1. *Cutting*: Uses high-frequency current to vaporize tissue.

2. *Coagulation*: Uses controlled heat to seal blood vessels.

Faraday's Law of Electromagnetic Induction:

A changing magnetic field induces an electromotive force (EMF) in a conductor, resulting in an electric current. The magnitude of the induced EMF is proportional to the rate of change of the magnetic field.

ROM (Read-Only Memory):

1. Stores permanent data and instructions.

2. Data cannot be modified or deleted.

RAM (Random Access Memory):

1. Temporarily stores data for processing.

2. Data is lost when power is turned off.

Types of Monitors:

1. LCD (Liquid Crystal Display)

2. LED (Light Emitting Diode)

i## **Defibrillator**:

A defibrillator is a medical device that delivers an electric shock to restore a normal heartbeat. It's used to treat life-threatening cardiac arrhythmias, such as ventricular fibrillation.

Radiation:

Radiation refers to energy that travels in waves or particles. In hospitals, various types of electromagnetic radiation are used, including:

1. X-rays (imaging)

2. CT scans (imaging)

3. Fluoroscopy (real-time imaging)

4. Radiation therapy (cancer treatment)

Radiation for Sterilization:

Gamma radiation is commonly used for sterilization of medical equipment and supplies.

Leakage Current:

Leakage current is an unintended flow of electricity to a patient's body, often through medical equipment. It can cause harm by disrupting heart function, potentially leading to cardiac arrest or other complications.

##Leakage current limits:

- Medical devices: 0.5 mA (normal), 1 mA (single fault)

- IT equipment: 3.5 mA (permanent), 0.25 mA (handheld)

Software:

Software refers to programs, applications, and operating systems that:

1. Run on computer hardware

2. Perform specific tasks or functions

###Health workers face various hazards, including:

1. Biological Hazards

2. Physical Hazards

3. Chemical Hazards

4. Psychological Hazards

5. Radiation Hazards

Types of Hazards:

Health workers face various hazards, including:

1. *Biological Hazards*: Exposure to infectious agents (e.g., viruses, bacteria) through contact with bodily fluids, contaminated surfaces, or airborne pathogens.

2. *Physical Hazards*: Exposure to workplace conditions that can cause injury or harm, such as needlesticks, falls, or ergonomic strain.

ALU (Arithmetic Logic Unit):

1. Performs arithmetic operations (addition, subtraction, multiplication, division).

2. Executes logic operations (AND, OR, NOT) for computational tasks.

Arithmetic and Logic Operations:

Arithmetic Operations:

1. Addition (+)

2. Subtraction (-)

3. Multiplication (*)

Logic Operations:

1. AND

2. OR

3. NOT

Display Screen Features:

1. *Resolution*: Number of pixels (e.g., HD, Full HD, 4K).

2. *Size*: Measured diagonally (e.g., 15 inches, 24 inches).

3. *Refresh Rate*: Frequency of image updates (e.g., 60Hz, 144Hz).

write two lines on CISC (Complex Instruction Set Computing):

CISC processors use complex instructions that can perform multiple tasks in a single clock cycle, reducing the number of instructions needed. This approach emphasizes hardware complexity over software simplicity.

two lines onRISC (Reduced Instruction Set Computing):

RISC processors use simple, optimized instructions that execute quickly, improving performance and efficiency. This approach emphasizes software optimization over hardware complexity.

Cyrix Processors:

1. *Integrated Floating-Point Unit (FPU)*: Enhanced floating-point performance.

2. *Power Management*: Efficient power consumption features.

types of Utility Software:

1. Antivirus software

2. Disk defragmentation software

3. Disk cleanup software

Magnetic Storage Devices:

1. Hard Disk Drive (HDD)

2. Floppy Disk

3. Magnetic Tape

Workstation:

A workstation is a high-performance computer designed for specialized tasks, such as:

1. Graphic design

2. Video editing

3. Engineering simulations

4. Scientific research

5. Software development

Factors Affecting Processing Speed:

1. *CPU Clock Speed*: Faster clock speeds process instructions quicker.

2. *Number of Cores*: More cores allow for parallel processing, increasing speed.

3. *RAM*: Adequate RAM ensures smooth processing without bottlenecks.

Transformer Working:

A transformer transfers electrical energy between circuits through electromagnetic induction, stepping up or stepping down voltage based on coil turns ratio.

Micro Shock Hazard:

Micro shock hazard refers to a small electrical current that can cause significant harm, particularly in medical settings where patients are connected to invasive devices (e.g., catheters, electrodes). Even a tiny current can disrupt heart function, potentially leading to ventricular fibrillation or cardiac arrest.

Output Systems:

Output systems refer to devices or components that display, transmit, or produce results from a computer. Examples include:

1. *Monitors/Displays*: Show visual output (text, images, videos).

2. *Printers*: Produce physical copies of digital content.

name some Operating Systems:

1. Windows

2. macOS

3. Linux

4. Android

5. iOS

Application Software:

Application software is a program designed to perform specific tasks or provide services to users, such as:

1. Word processing

2. Web browsing

3. Gaming

4. Spreadsheet analysis

5. Photo editing

Types of Storage Devices:

1. *Hard Disk Drive (HDD)*: Non-volatile, magnetic storage.

2. *Solid-State Drive (SSD)*: Fast, non-volatile flash storage.

3. *USB Flash Drive*: Portable, non-volatile flash storage.

Parts of a Computer System:

1. Hardware

2. Software

3. Input Devices

4. Output Devices

5. Storage Devices

Brief Overview of Hardware:

Hardware refers to the physical components of a computer system, such as:

- Central Processing Unit (CPU)

- Memory (RAM)

- Motherboard

- Storage drives (HDD/SSD)

These components work together to process and store data.

Mainframe:

A mainframe is a high-performance, large-scale computer system for processing and managing vast amounts of data and transactions.

Used in:

1. Financial institutions (banks, insurance)

2. Government agencies

3. Large enterprises

4. Healthcare organizations

Word Processing Software:

Word processing software is a type of application that allows users to create, edit, and format text documents. Examples include:

1. Microsoft Word

2. Google Docs

3. LibreOffice Writer

PAN (Personal Area Network) vs LAN (Local Area Network):

PAN:

- A small network for personal devices (e.g., phone, computer, headphones)

- Limited range (typically a few meters)

- Used for device-to-device communication

LAN:

- A network connecting devices within a larger area (e.g., home, office, building)

- Larger range (up to several hundred meters)

- Used for sharing resources, files, and internet connections

Internet:

The internet is a global network of interconnected computers and servers that facilitate communication, information sharing, and data exchange.

Two Uses of Internet:

1. *Information Access*: Accessing vast amounts of information, resources, and knowledge.

2. *Communication*: Enabling email, social media, online messaging, and video conferencing.

Data vs Information:

Data:

- Raw, unprocessed facts and figures

- Lack context and meaning

Information:

- Processed, organized, and meaningful data

- Provides insights, answers questions, and supports decision-making

GUI and CLI:

1. **GUI (Graphical User Interface):**

- A visual interface that uses windows, icons, and menus.

- Users interact with graphical elements.

2. **CLI (Command Line Interface):**

- A text-based interface that uses commands.

- Users interact by typing commands.

DAICOM:

DAICOM means Data Acquisition and Communication.

It is used to collect data from machines or sensors and send it to other devices or computers. It helps in monitoring and controlling things from a distance.

Ergonomic Keyboard:

An ergonomic keyboard is a specially designed keyboard that promotes comfortable typing and reduces strain on hands, wrists, and arms.

Used for:

1. *Injury prevention*: Reduces risk of repetitive strain injuries (RSI) and carpal tunnel syndrome.

2. *Comfort*: Promotes natural hand and wrist positions, enhancing typing comfort and productivity.

Alternative Devices for Hand:

1. Touchpad

2. Touchscreen

3. Graphics tablet

Bar Code Reader:

A device that scans and decodes barcodes, capturing data quickly and accurately.

Enlist the four features of comparing monitors and define any one of them. short answer

Features of Comparing Monitors:

1. *Resolution*

2. *Screen Size*

3. *Refresh Rate*

4. *Response Time*

Definition of Resolution:

Resolution refers to the number of pixels (horizontal and vertical) displayed on a monitor, determining image clarity and detail. Higher resolution typically provides sharper and more detailed images

Evaluating Printers:

Printers can be evaluated based on:

1. *Print Quality*: Resolution and clarity of printed output.

2. *Speed*: Pages per minute (ppm) printed.

3. *Cost*: Initial cost, ink/toner expenses, and maintenance.

4. *Connectivity*: Options like USB, Wi-Fi, or network connectivity.

5. *Paper Handling*: Capacity and versatility (e.g., duplex printing).

These factors help determine the suitability of a printer for specific needs and applications.

Binary Numbers:

A number system using only two digits: 0 and 1. It's the basis for computer programming and digital electronics.

Occupational Health Hazards:

1. *Physical hazards* (noise, vibration, radiation)

2. *Chemical hazards* (toxins, gases, fumes)

3. *Biological hazards* (viruses, bacteria, parasites)

4. *Ergonomic hazards* (repetitive strain, poor posture)

5. *Psychosocial hazards* (stress, violence, harassment)

Accident:

An unexpected and unplanned event that results in injury, damage, or loss.

Hazard vs. Risk:

Hazard: Potential source of harm.

Risk: Likelihood of harm occurring.

Key differences:

1. Hazard is the potential threat.

2. Risk is the probability of that threat causing harm.

Ionization vs. Excitation:

Ionization:

The process of gaining or losing electrons, resulting in the formation of ions (e.g., atoms or molecules becoming charged).

Excitation:

The process of gaining energy, moving electrons to a higher energy state, without losing or gaining electrons (e.g., atoms or molecules becoming energized but remaining neutral).

Conditions for Physiological Effects of Current:

1. *Current flow*: Electric current must pass through the body.

2. *Sufficient magnitude*: The current must be strong enough to cause an effect.

3. *Duration*: The current must flow for a sufficient amount of time.

4. *Pathway*: The current must pass through a path that affects vital organs or tissues.

Ventricular Fibrillation:

A life-threatening heart condition where the ventricles beat in an irregular, chaotic rhythm, leading to ineffective blood circulation and potentially fatal consequences if not treated promptly.

Hospital Areas and Leakage Voltage Limits:

General Areas:

1. Patient rooms

2. Administrative offices

3. Waiting areas

Critical Areas:

1. Operating rooms

2. Intensive care units (ICUs)

3. Cardiac care units (CCUs)

Leakage Voltage Limits:

Vary by area and equipment type, but typically:

- General areas: 100-500 µA (microamperes)

- Critical areas: 10-50 µA (microamperes) or lower, depending on equipment and standards.

Shock:

A life-threatening condition where insufficient blood flow reaches vital organs, potentially causing damage or failure.

Safety:

Freedom from unacceptable risks, hazards, or harm, achieved through measures protecting people, property, and the environment.

CPU (Central Processing Unit):

The CPU is the brain of the computer, responsible for executing instructions and performing calculations, enabling the system to process data and perform tasks.

Trackball vs. Trackpad:

Trackball:

A pointing device with a ball that rotates to control cursor movement, often used in laptops or specialized mice.

Trackpad:

A touch-sensitive surface that detects finger movements to control cursor movement, commonly found on laptops.

Machine Cycle

The sequence of steps a CPU follows to execute an instruction, typically including:

1. Fetch

2. Decode

3. Execute

4. Store

Magnetic Storage:

Magnetic storage uses magnetic fields to store data on devices like hard disk drives (HDDs). Data is recorded by magnetizing tiny areas on a disk, allowing for:

1. Data writing (magnetizing areas)

2. Data reading (detecting magnetic fields)

GUI (Graphical User Interface) Tools:

GUI tools provide visual interfaces for users to interact with computers, featuring:

1. Windows

2. Icons

3. Menus

4. Graphics

Editing a Document:

A document can be edited in a word processing program by:

1. Typing and deleting text

2. Formatting options (font, size, color)

3. Cutting, copying, and pasting text

4. Using tools like spell check and grammar check

Uses of Presentation Programs:

1. Creating slides for lectures, meetings, or conferences.

2. Displaying information in a visually engaging format using text, images, and multimedia.

Modems:

Modems (Modulator-Demodulator) are used to:

1. Connect computers to the internet via dial-up or broadband connections.

2. Enable data transmission over telephone lines or cable networks.

Physiological Effects of Current:

1. Cardiac arrest

2. Muscle contraction

3. Burns

4. Nerve damage

Definition of muscle contraction :

Muscle contraction: Muscle contraction occurs when electric current stimulates muscles, causing involuntary contractions, potentially leading to immobilization or injury.

Fibrillation:

Fibrillation is a serious heart condition where the heart's ventricles beat rapidly and irregularly, leading to inadequate blood circulation.

Machine used for its cure:

Defibrillator: A medical device that delivers an electric shock to restore a normal heartbeat.

Presentation Software:

Presentation software is a type of application that allows users to create, edit, and display multimedia presentations. Examples include:

1. Microsoft PowerPoint

2. Google Slides

Digital Image:

A digital image is a representation of a visual scene or object in digital format, composed of pixels (tiny units of color) arranged in a grid. It's stored as binary data and can be displayed on digital devices like computers, smartphones, or televisions.

A current of 0.75 A is drawn by the filament of an electric bulb for 10 minutes. Find the amount of electric charge that flows through the circuit.

- Current (I) = 0.75 A

- Time (t) = 10 minutes = 10 × 60 = 600 seconds

Formula:

$Q = I \times t$

Calculation:

$Q = 0.75\ A \times 600\ s = 450\ C$

Answer:

The amount of electric charge that flows through the circuit is 450 Coulombs.

Microwaves:

Microwaves are a type of electromagnetic wave with wavelengths between 1 mm and 30 cm, and frequencies between 300 MHz and 300 GHz. They are used in:

1. Microwave ovens for heating and cooking food

2. Wireless communication (e.g., mobile phones, Wi-Fi)

3. Radar technology

Patient Safety:

Patient safety refers to the prevention of harm or adverse effects to patients during healthcare delivery. It involves:

1. Error prevention

2. Infection control

3. Safe medication practices

4. Effective communication

The goal is to ensure a safe environment for patients, promoting high-quality care and minimizing risks.

Pathogenic Microorganisms:

Pathogenic microorganisms are disease-causing microbes, including:

1. Bacteria (e.g., _E. coli_, _Staphylococcus_)

2. Viruses (e.g., influenza, HIV)

3. Fungi (e.g., _Candida_)

4. Protozoa (e.g., _Plasmodium_)

These microorganisms can cause infections and diseases in humans, animals, and plants.

Pacemaker:

A pacemaker is a small, battery-operated medical device implanted in the chest to regulate heartbeat. It sends electrical impulses to stimulate heart contractions, ensuring a consistent heart rate in individuals with abnormal heart rhythms (arrhythmias). This device helps manage conditions like bradycardia (slow heart rate) and improves heart function and overall health.

Operating System (OS):

An Operating System is software that manages computer hardware and software resources, providing a platform for running applications. It acts as an intermediary between users and computer hardware, controlling tasks like:

1. Process management

2. Memory management

3. File management

4. Input/Output operations

Examples: Windows, macOS, Linux, Android.

MIS (Management Information System):

A Management Information System (MIS) is a computer-based system that provides managers with tools to organize, analyze, and evaluate information to make informed decisions. It generates reports and insights to support organizational planning, operations, and control.

Conducive Paths of Current to the Heart:

1. Hand-to-hand contact

2. Hand-to-foot contact

These paths allow electric current to flow through the chest, potentially affecting the heart.

Minimizing Radiation Effects:

1. *Shielding*: Using protective barriers (e.g., lead aprons)

2. *Distance*: Maintaining a safe distance from radiation sources

3. *Time*: Limiting exposure time

Precautions to Prevent Accidents:

1. Follow safety guidelines and protocols.

2. Use personal protective equipment (PPE).

3. Ensure proper training and awareness.

4. Regularly inspect equipment and work areas.

5. Adhere to warning signs and labels.