**What is a software? Mention the types of software with examples. What is meant by primary memory? Explain their types briefly. 1+4+1+4=10**

### ****What is a Software?****

Software is a collection of programs, data, and instructions that tell a computer how to perform specific tasks.  
Software is the non-physical part of a computer that makes hardware function properly.

Its server as a bridge between the user and the computer hardware, enabling user to interact with the system and perform various task.

### ****Types of Software****

#### **1. System Software**

* **Definition**:  
  System software is software designed to control hardware components and provide a platform for running application software.
* **Examples**:
  + **Operating Systems (OS)**: Windows, macOS, Linux.
  + **Device Drivers**: Printer drivers, network card drivers.
  + **Utility Software**: Antivirus programs, Disk Management Tools.

#### **2. Application Software**

* **Definition**:  
  Application software is software designed to perform specific tasks for users, such as creating documents, browsing the internet, or playing games.
* **Examples**:
  + **Web Browsers**: Google Chrome, Mozilla Firefox, Microsoft Edge.
  + **Multimedia Software**: VLC Media Player.
  + **Communication Software**: Zoom, Viber, WhatsApp.

### ****Primary Memory****

Faster Memory used to temporarily store data and information that are needed immediately by the CPU to execute tasks.  
It is volatile, which means the data is lost when the computer is turned off.

### ****Types of Memory****

#### **1. RAM (Random Access Memory)**

* **Definition**:  
  RAM is a volatile memory that temporarily stores data and instructions that are currently executed by the CPU. It is volatile, which means the data is lost when the computer is turned off.
* **Example**: 8 GB of DDR4 RAM in a computer.

#### **2. ROM (Read-Only Memory)**

* **Definition**:  
  ROM is a non-volatile memory that stores computer startup instructions like firmware (e.g., BIOS). The data is not lost when the computer is turned off.
* **Example**: BIOS chip on the motherboard.

#### **3. Cache Memory**

* **Definition**:  
  Cache memory is small, high-speed memory located near the CPU. It stores frequently accessed data and instructions. It is designed to make processing speed faster by reducing CPU reliance on main memory.
* **Example**: L1, L2, and L3 cache within a CPU.

**What are quality factors of display devices? Discuss types of display devices?**

4 + 6 = 10

**The quality of display devices depends on the following factors:**

1. **Resolution:**  
   This refers to the number of pixels on the screen, measured in pixels per inch (PPI).  
   **Example:**  
   1920 \* 1080 (Full HD)  
   3840 \* 2160 (4K)
2. **Brightness:**  
   Brightness is the intensity of light emitted by the screen, measured in nits. A higher brightness level makes the display easier to view.
3. **Contrast Ratio:**  
   This measures the difference between the darkest and lightest parts of the screen. A higher contrast ratio means blacks look deeper and whites look lighter, improving image quality.
4. **Refresh Rate:**  
   This describes how the screen updates the image each second, measured in Hertz (Hz). A higher refresh rate results in smoother motion.  
   **Example:**  
   60Hz (standard)  
   120Hz (gaming)
5. **Response Time:**  
   This describes how quickly a pixel changes color. A lower response time helps to reduce blurring effects during fast-moving scenes.

**Types of Display Devices:**

1. **Cathode Ray Tube (CRT):**  
   **Description:** A CRT creates images by firing electron beams at the phosphor dots on the screen.  
   **Advantage:** Cost-effective and durable  
   **Disadvantage:** Older technology and consumes more power.  
   **Example:** Bulky computer monitors and TVs used in the 1990s and early 2000s.
2. **Liquid Crystal Display (LCD):**  
   **Description:** An LCD creates images by using liquid crystal to control light passing through a backlight.  
   **Advantage:** Lightweight, consumes less energy, good image quality  
   **Disadvantages:** Limited viewing angles, expensive  
   **Example:** Flat-screen TVs, laptop screens.
3. **Light Emitting Diode (LED):**  
   **Description:** A type of LCD that uses an LED backlight for improved brightness and contrast ratio.  
   **Advantage:** Consumes less energy, lightweight than LCD  
   **Disadvantage:** More expensive than LCD  
   **Example:** LED TVs and monitors.
4. **Organic Light Emitting Diode (OLED):**  
   **Description:** An OLED creates images by using organic compounds that emit light when electricity passes through them.  
   **Advantage:** Wide viewing angles, vibrant images  
   **Disadvantages:** Expensive  
   **Example:** High-end TVs, gaming monitors.
5. **Touchscreen Displays:**  
   **Description:** A touchscreen display detects touch input, allowing users to interact directly with the screen.  
   **Advantage:** User-friendly  
   **Disadvantage:** Prone to scratches and fingerprints  
   **Example:** Smartphones, tablets.

**Provide a brief account of the hardware components used in a computer System. 5 marks**

**A computer system is composed of various hardware components that work together to perform tasks.**

1. **Central Processing Unit**  
   **Function**: The CPU is the brain of the computer. It performs all the calculations, executes instructions, and manages the data flow within the system.  
   **Components**: It consists of the Control Unit (CU), Memory Unit/Register, Arithmetic Logic Unit (ALU).  
   **Examples**: Intel i7, AMD Ryzen.
2. **Motherboard**  
   **Function**: This is the main circuit board that connects all the components of the computer. It allows communication between the CPU, memory, and other components.  
   **Components**: It consists of CPU socket, memory slots, power connector, and data buses.  
   **Examples**: ASUS ROG, MSI B450.
3. **Primary Memory**  
   **Function**: Primary memory is a high-speed storage device used to temporarily store data and information that are needed immediately by the CPU to execute tasks. It is volatile, meaning the data is lost when the computer is turned off.  
   **Example**: 16 GB of DDR4 RAM in a computer.
4. **Secondary Storage**  
   **Function**: These devices provide long-term data storage for the operating system, applications, and files. These devices are non-volatile, meaning data is not lost when the computer is turned off.  
   **Examples**: Hard Disk Drives (HDD), Solid-State Drives (SSD), USB Flash Drives.
5. **Input Devices**  
   **Function**: These devices allow the user to interact with the computer by providing input data.  
   **Examples**: Keyboard, mouse, microphone.
6. **Output Devices**  
   **Function**: These devices display the processed data to the user.  
   **Examples**: Monitor, printer, speaker.

**Explain various types of operating system. 5 marks**

**Types of Operating Systems**

1. **Batch Operating System**  
   **Function:**  
    i) Processes jobs in batches without user interaction.  
    ii) Jobs are collected and processed together in sequence.  
   **Advantage:** Minimizes CPU idle time.  
   **Example:** IBM 7090, early mainframe systems.
2. **Real-Time Operating System (RTOS)**  
   **Function:**  
   i) Guarantees the execution of tasks within strict time frames.  
   ii) Used in systems where timing is critical (e.g., flight control).  
   **Advantage:** Timely response to external events.  
   **Example:** RTLinux, QNX.
3. **Time-Sharing Operating System (Multitasking OS)**  
   **Function:**  
   Allows multiple users to access the computer simultaneously by dividing CPU time into time slices for each user. This gives the illusion of simultaneous execution.  
   **Advantage:** Efficient multitasking.  
   **Example:** UNIX.
4. **Server Operating System**  
   **Function:**  
   Runs on servers to manage resources and deliver services (e.g., file sharing, web hosting, database management) to other computers (clients) over a network.  
   **Advantage:** High performance, centralized management.  
   **Example:** Linux Server, Windows Server.
5. **Multiprocessor Operating System**  
   **Function:**  
   Manages systems with multiple CPUs, allowing parallel processing.  
   **Advantage:** Reliability and performance.  
   **Example:** High-performance computing systems, systems with multiple cores.
6. **Distributed Operating System**  
   **Function:**  
   i) Manages a group of independent computers as a single system.  
   ii) Shares resources like processor, memory, and storage across a network.  
   **Advantage:** Ensures efficient resource allocation.  
   **Example:** Google Cloud, Amazon Web Services.

**Mention the Function of Operating System (5 marks)**

**Operating system is broker between computer System and User". Justify the statement?**

**Explain the major functions of an operating system briefly.**

Key functions of an OS

* **User Interface**:  
  The OS provides both graphical (GUI) and command-line (CLI) interfaces, allowing users to interact with the system without needing technical knowledge of hardware.
* **Resource Management**:
  + **CPU Scheduling**: The OS allocates CPU time to different processes, ensuring each process gets fair access to the CPU.
  + **Memory Management**: The OS manages allocation and deallocation of memory to processes, to avoid conflicts.
  + **Device Management**: The OS manages input/output devices, such as keyboards, mice, printers, and storage devices. It provides a standard way for applications to access these devices, so users don’t have to manage hardware directly.
  + **File Management**: The OS organizes files and directories, making it easy for users to store and access data.
* **Security**:  
  The OS implements various security mechanisms to protect the system from unauthorized access and malicious attacks. This includes user authentication (passwords, biometrics), and encryption. The OS ensures that resources are accessible only to authorized users or applications, thus preventing data breaches and system compromises.
* **Error Handling**:  
  The OS is designed to detect, handle, and recover from errors. These errors could be hardware failures, software crashes, or resource conflicts. The OS provides meaningful error messages and takes corrective actions, such as terminating faulty processes. In critical cases, it may shut down processes or even the entire system to avoid further damage.

**Define database, write down the various services provided by DBMS. 5 marks**

**Database Definition:**

A database is an organized collection of data or information, organized into tables, rows, and columns. This data is structured in such a way that it is easy to manage, retrieve, and manipulate. A database is designed to handle large amounts of data by storing, managing, and retrieving information when needed.

Services provided by DBMS

1. Data Integrity   
   Definition: Ensure that the data in the database is accurate, consistent, and reliable.  
   Example: Preventing duplicates records by enforcing primary key.
2. Data Security  
   Definition: Protect the database from unauthorized access, modification, or deletion.  
   Example: setup user roles and permission to access sensitive data.
3. Data Manipulation  
   Definition: provide a set of operations (such as insert, update, delete) to manipulate data within database.  
   Example: use SQL commands to insert new records or update existing record.
4. Transaction Management  
   Definition: Ensures that database transactions are completed successfully and maintains ACID properties.  
   Example: ensuring bank transfer transaction is completed or rollback in case of error.
5. Concurrency Control  
   Definition: Allows multiple users or applications to access the database simultaneously, preventing conflicts.  
   Example: Locking mechanism to prevent multiple users from simultaneously editing the same data.
6. **Data Backup and Recovery**  
   **Definition:** It ensures that all critical data is backed up regularly and ensures a data recovery plan to minimize downtime in case of system failure or security breach.  
   Example: Scheduled backups and point-in-time recovery.

**What are the advantages of DBMS over traditional file system in data management? 5 marks**

1.Data Integrity

DBMS ensure that the data in the database is accurate, consistent, and reliable.

File systems have lack of data integrity features, risk of invalid or inconsistent data.

2)Data Security

DBMS protects the database from unauthorized access, modification, or deletion.

File system have limited security features, making data vulnerable to unauthorized access and breaches.

3) Concurrency Control

DBMS allows multiple users or applications to access the database simultaneously, preventing conflicts.

File systems have difficulty to handle multiple people accessing the same file at the same time, leading to data corruption.

4)Data Redundancy and Duplication

DBMS helps to reduce data duplication by storing data in one central location.

File systems have more duplicate data because the same information can be stored in different files.

5) **Backup and Recovery**

DBMS provides automatic backup and recover mechanism in case of system failure.

File system require manual backup processes, and recovery can be complex.

**What is Hardware. Differentiate between device driver and firmware. 1 +4 = 5 mark**

Hardware refers to the physical component of a computer system, such as central Processing unit (CPU), memory devices, storage devices, input/output devices. They are tangible part of computer that works together to execute software instructions and perform various task.

A screenshot of a computer

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**What is Software? Discuss about different types of software. 2 + 8 = 10**

**What is Software?**  
Software is a collection of programs, data, and instructions that tell a computer how to perform specific tasks.  
Software is the non-physical part of a computer that makes hardware function properly.  
It serves as a bridge between the user and the computer hardware, enabling the user to interact with the system and perform various tasks.

**Types of Software**

1. **System Software**
   * **Definition:**  
     System software is software designed to control hardware components and provide a platform for running application software.
   * **Examples:**
     + **Operating Systems (OS):** Windows, macOS, Linux
     + **Device Drivers:** Printer drivers, network card drivers
2. **Application Software**
   * **Definition:**  
     Application software is software designed to perform specific tasks for users, such as creating documents, browsing the internet, or playing games.
   * **Examples:**
     + **Web Browsers:** Google Chrome, Mozilla Firefox
     + **Multimedia Software:** VLC Media Player
     + **Communication Software:** Zoom, WhatsApp
3. **Utility Software**
   * **Definition:**  
     Utility software is a system software designed to perform specific tasks, such as disk cleanup, file compression, and antivirus protection.
   * **Examples:**
     + **File Management Tools:** WinRAR, 7-Zip
     + **Disk Management Tools:** Disk Cleanup
     + **Antivirus Software:** Avast, Norton
4. **Firmware Software**
   * **Definition:**  
     Firmware is a type of software that is embedded into hardware devices to control their functions.
   * **Examples:**
     + **BIOS/UEFI:** Used to initialize hardware during boot-up
     + **Device Control:** Printer firmware, router firmware
     + **Embedded Systems:** Washing machines
5. **Open-Source Software**
   * **Definition:**  
     Open-source software is a type of software whose source code is available to the public, allowing anyone to view, modify, and share it.
   * **Examples:**
     + **Operating Systems:** Linux, Ubuntu
     + **Web Browsers:** Mozilla Firefox
     + **Development Tools:** Git, Visual Studio Code
6. **Development Software**
   * **Definition:**  
     Development software includes tools or programs used by developers to create, test, and maintain software.
   * **Examples:**
     + **Code Editors:** Visual Studio Code, Notepad
     + **Version Control Systems:** Git, GitHub
     + **Testing Tools:** Selenium

**What is digital Computer? Explain the components of digital computer with suitable block diagram. 5 marks**

Digital Computer

A digital computer is a electronic device that processes data in binary form (0s and 1s) to perform calculations, data storage, and decision making. It is widely used in personal, scientific, and industrial area because of its speed, accuracy and reliability.

Block Diagram of a Digital Computer

A diagram of a computer

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Components of a Digital Computer

1. **Central Processing Unit**  
   **Function**: The CPU is the brain of the computer. It performs all the calculations, executes instructions, and manages the data flow within the system.  
   **Components**: It consists of the Control Unit (CU), Memory Unit/Register, Arithmetic Logic Unit (ALU).  
   **Examples**: Intel i7, AMD Ryzen.
2. **Primary Memory**  
   **Function**: Volatile memory used to store data and instructions currently in use by the CPU. It is volatile, meaning the data is lost when the computer is turned off.  
   **Example**: 16 GB of DDR4 RAM in a computer.
3. **Secondary Storage**  
   **Function**: These devices provide long-term data storage for the operating system, applications, and files. These devices are non-volatile, meaning data is not lost when the computer is turned off.  
   **Examples**: Hard Disk Drives (HDD), Solid-State Drives (SSD), USB Flash Drives.
4. **Input Devices**  
   **Function**: These devices allow the user to interact with the computer by providing input data.  
   **Examples**: Keyboard, mouse, microphone.
5. **Output Devices**  
   **Function**: These devices display the processed data to the user.  
   **Examples**: Monitor, printer, speaker.

**What do you understand by multimedia? Explain. 5 marks**

Multimedia is a type of medium that allows information to be presented and shared in various formats. It combines text, audio, video, images, and animation into a single platform using a computer. Multimedia allows information to be expressed in a more engaging way.

**Key Features:**

* **Use Different Media:** Combines pictures, sounds, and videos to create and share information.
* **Makes Communication Interesting:** By mixing various media types (like images and music), it makes communication more interesting/engaging.
* **User-Friendly:** Users can interact with the content, like clicking on links or buttons to explore more.

**Applications:**

1. **Education and E-Learning:**  
   Multimedia is widely used in classrooms and online learning platforms by using videos, audio, and animation.
2. **Entertainment:**  
   Movies and TV shows use multimedia to mix visuals and sound to make the experience more enjoyable.
3. **Social Media:**  
   On platforms like Facebook, Instagram, and YouTube, multimedia allows users to share photos and videos to make communication more engaging.
4. **Advertising and Marketing:**  
   In advertising, brands use images, videos, sound, and animations in ads to grab user attention.

**Benefits:**

1. **Increased Engagement:** It captures attention and keeps people interested in the content.
2. **Better Learning:** It improves learning techniques by using different media.
3. **Clear Communication:** Multimedia simplifies complex ideas in a simple way.

**What are the various computer settings that can be configured through windows control panel? State 5 marks**

The Windows Control Panel allows users to configure various settings on their computer. These include:

1. **System and Security**
   * **Backup Settings:** set up regular data backups to protect it in case of system failure.
   * **Firewall Settings:** Set up rules to block unauthorized access to the system.
2. **Network and Internet**
   * **Manage Network Connections:** View and configure network settings, including Wi-Fi, Ethernet connections, and network troubleshooting.
3. **Hardware and Sound**
   * **Device Manager:** View, install, update, troubleshoot hardware drivers and connected devices.
4. **Programs**
   * **Uninstall or Modify Installed Programs:** Remove or modify installed programs and applications.
   * **Set Default Programs:** set default programs for tasks such as web browsing, photo viewer.
5. **User Accounts**
   * **Manage User Accounts:** Create, delete, or modify user accounts.
   * **Change Account Password:** Update or change passwords to keep accounts secure.
6. **Clock, Language, and Region**
   * **Set Date and Time:** Adjust the system clock and time zone.
   * **Choose Display Language:** Set up the preferred language for the system.

**Differentiate between primary key and foreign key with example. 5 marks**

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**What is database management system (DBMS)? Briefly explain various types of relationships in a database with examples. Why do we need to validate and format field data in database? 2 + 6 + 2 = 10**

**1. What is a Database Management System (DBMS)?**

A **Database Management System (DBMS)** is a software application that allows users to create, manage, and manipulate databases. It provides tools for storing, retrieving, updating, and organizing data in a structured way. A DBMS ensures that data is easily accessible, consistent, and secure. Popular examples of DBMS include **MySQL**, **Oracle Database**, and **Microsoft SQL Server**.

**Types of Relationships in a Database:**

Relationships in a database define how tables are connected to each other. These include:

### 1) ****One-to-One Relationship****

* **Definition**: A single record in one table corresponds to exactly one record in another table.
* **Example**: A person can have only one passport number, and the passport number belongs to only one person.
* **Diagram**

A close-up of a passport

Description automatically generatedA screen shot of a computer screen

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### 2) ****One-to-Many Relationship****

* **Definition**: A single record in one table corresponds to multiple records in another table.
* **Example**: A customer can place multiple orders.
* **Diagram**

A screenshot of a computer

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A screenshot of a computer

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### 3) ****Many-to-Many Relationship****

* **Definition**: Multiple records in one table can be associated with multiple records in another table.
* **Example**: A student can take many courses, and a course can be taken by many students.
* **Diagram**

A diagram of a class

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A screenshot of a computer program

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**Importance of Data Validation and Formatting**

1) **Data Validation**

Data validation ensures that data entered into the database is correct and predefined rules.

Examples  
a) ensuring that email column only contain valid email address.

b) ensuring that mandatory column (like Name or Email) are not left blank.

c)settings constraint like unique (e.g., no duplicate emails)

A close-up of a computer screen

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2) **Data Formatting**

Data formatting ensures that data is stored and display in organized way.

Example:

a) storing phone numbers in a uniform format (e.g., +1-555-555-555)

b) storing dates in a consistent format (YYY-MM-DD)

**Define Social Media. Discuss the use of social media in governance. 5 marks**

Social media is an online platform that allows people to communicate, share ideas, and interact with others through the internet. Popular platform such as Facebook, Twitter, Instagram, and LinkedIn allow real-time communication and connection.

**Define IP Address, Subnet Mask and Default Gateway? 5 marks**

### ****Definition of IP Address****

An **IP Address** (Internet Protocol Address) is a unique address assigned to each device connected to a network. It allows the devices to communicate with each other over the internet or a local network.  
There are two types of IP Addresses:

* **a)** **IPv4** – 32 bits, written in decimal format
* **b)** **IPv6** - 128 bits, written in the hexadecimal format

### ****Definition of Subnet Mask****

A **subnet mask** is a 32-bit number that divides an IP Address into the network and host portions. It is used to define which part of an IP Address refers to the network and which part refers to the device (host).

**Example**:  
For an IP address **192.168.1.1** with a subnet mask **255.255.255.0**:

* **Network**: 192.168.1.0
* **Host Range**: 192.168.1.1 to 192.168.1.254

**Definition of Default Gateway**

A default gateway is a router IP Address or access points that connects the local network to the external network (such as internet). When a device wants to communicate with another device outside its local network, it sends the data packet to the default gateway router. Then default gateway forwards the packet to the destination.

Example:

If your device has an IP Address of 192.168.1.89 and subnet mask of 255.255.255.0, your default gateway might be 192.168.1.1. If your device wants to communicate outside the local network, then it sends the data packet to the 192.168.1.1. Then router forwards the packet to the destination.

**What is an IP Address and Subnet Mask? How can one assign an IP Address to PC? 5 marks**

### ****Assigning an IP Address to a PC****

#### **Static IP Address Process**

1. **Open Network Settings**:  
   Go to **Control Panel → Network and Sharing Center → Change Adapter Settings**.
2. **Select Network Adapter**:  
   Choose either **Ethernet** or **Wi-Fi**.
3. **Edit the IP Configuration**:  
   Choose **Manual (static)** IP configuration.
4. **Enter the IP Address**:  
   Manually input the **IP Address**, **Subnet Mask**, and **Default Gateway**.
5. **Save and Apply**:  
   Save the changes.

#### **Dynamic IP Address Process**

This method uses a **DHCP Server** (Dynamic Host Configuration Protocol) to automatically assign an IP address to devices on the network.

* **Process**:
  + **a)** When a PC connects to the network, it sends a request to the **DHCP server**.
  + **b)** The **DHCP server** assigns an available IP address from its pool and sends it back to the PC.
  + **c)** The PC uses the assigned **IP Address** to communicate over the network.

**Write short note on "Identity and Access Control". 5 marks**

**Describe about the major services provided by Government Integrated Date Center. 5 marks**

**What do you understand by an UPS? Differentiate between online and offline UPS. 5 marks**

Definition of UPS (Uninterruptible Power Supply)

An UPS is device that provides backup power to electronic equipment during power outages, blackouts, or fluctuations. It ensures that critical devices such as computer, servers, routers continue operate without interruption when the main power source fails.

A screenshot of a computer

Description automatically generated

**Define Web Page and Content Management System (CMS). Write a code in HTML to create a webpage containing at least: title text, body background, a table having one row and two columns, an image and a text with hyperlinks.**

Definition of Web Page

A web page is a document that is displayed in a web browser and can contain various types of contents such as text, images, videos, links. It is written in HTML (Hypertext Markup Language) and is designed to viewed by users over a internet.

Definition of Content Management System (CMS)

CMS is a software application or platform that allows users to create, manage and modify content on a website without requiring technical knowledge. It provides tools for content creation, editing, publishing, making it easier to maintain to website.

A screenshot of a computer program

Description automatically generated

**Give the difference between RISC and CISC architecture. 5 marks**

**How does DML differ from DDL? Explain DML and DDL statements with example of each. 2 + 8 = 10**

A screenshot of a computer

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**Data Definition Language (DDL)**  
**Definition:** Define the structure of the database, including tables, views, indexes, data types, relationships, and constraints.  
**Operations:** CREATE, ALTER, DROP, TRUNCATE

Example of DDL Statement

A screenshot of a computer code

Description automatically generated

**Data Manipulation Language (DML)**  
**Definition:** It allows the user to perform operations such as inserting, updating, deleting, or retrieving data from the database. These operations are achieved through SQL (Structured Query Language).  
**Operations:** INSERT, UPDATE, SELECT, DELETE

Example of DML Statement

A screenshot of a computer code

Description automatically generated

**What is polymorphism? What are its types? Explain any one with example 2 + 2 + 6 = 10**

Definition of Polymorphism

Polymorphism is a core concept in object-oriented programming that allows objects of different classes to be treated as objects of a common superclass. It enables code to be more flexible, reusable, and easier to maintain.

Types of Polymorphism

1)Comple-time polymorphism (Static Polymorphism)

a) achieved through method overloading and operator loading

b) the compiler determines which function or operator to call based on the types of parameters provided at compile time.

2)Run-time polymorphism (Dynamic Binding)

a) achieved through method overriding (inheritance or virtual functions)

b) the decision about which function to call is made at runtime based on the object

**Explain the importance of relationships in a relational database system. Describe the type of relationships commonly used in database design (1+2+2=5 Marks)**

Relationships in a database define how tables are connected to each other. These include:

Data Integrity: Relationship ensure that data in one table matches correctly with data in related tables. This helps data anomalies and maintain consistent.

Data Normalization: Relationship allows data to be organized into multiple tables, which reduces repeating information. This makes the database more efficient.

**What is an operating system? List down its major functions. (2+3=5 Marks)**

Definition of Operating System

An operating system is the core software that manages a computer hardware and software resources. It acts as an interface between the user and the hardware, allowing user to interact with the system and run applications.

What is database? Explain How is database used in CDS? 2 + 3 = 5

CDS uses databases to perform critical function in the financial sector.

1)Depository Services: CDS maintain a database that stores detailed records of investors shares, bonds and other securities in dematerialized form.

2)Ownership and Transaction Records: CDS keeps track of who own which shares or securities and ensure smooth transfer of ownership whenever shares are bought or sold.

3) **Clearing and Settlement**: CDSC makes sure all stock trades are completed properly by checking that both the buyer and seller have the right amount of money and shares, and then completing the transaction.

4)Compliances: CDSC uses databases to track transactions and generate reports for audits, ensuring compliance with SEBON’s regulations.

A white table with black text

Description automatically generated

**What are the different applications of computer? Explain with examples describe about memory hierarchy of computer system 6 + 4 = 10**

**Computers have become integral to various domains, enabling faster and more accurate work. Below are some key applications of computers:**

1. **Education and E-Learning**  
   Computers are widely used in classrooms and online learning platforms through videos, audio, and animation.  
   **Example**: Platforms like FreeCodeCamp and Google Classroom.
2. **Entertainment**  
   Computers are used for creating animations, streaming content, and video games.  
   **Examples**: Platforms like Netflix for streaming and Adobe Pro for editing videos.
3. **Communication**  
   Computers are used for communication through email, social media, and video conferencing.  
   **Example**: Zoom for virtual meetings and Facebook for connecting with people globally.
4. **Business and Finance**  
   Computers are used for data analysis, financial management, and online transactions.  
   **Example**: Accounting software like QuickBooks and Remittance Money Transfer Systems.
5. **Scientific Research**  
   High-performance computers are used to run experiments, analyze data, and make discoveries.  
   **Example**: Supercomputers for weather prediction.
6. **Healthcare**  
   Computers are used for diagnosing diseases, maintaining patient records, and conducting medical research.  
   **Example**: MRI and CT scan machines, and hospital management systems.

A diagram of a storage system

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**Register**

* **Description**: Smallest and fastest memory, located within the CPU.
* **Example**: Temporary storage for instructions and operands during execution.

**Cache Memory**

* **Description**: A small, fast memory placed between the CPU and main memory to store frequently accessed data.
* **Example**: L1, L2, L3 Cache in processors.

**Main Memory (RAM)**

* **Description**: Volatile memory used to store data and instructions currently in use by the CPU.  
  It is volatile, which means the data is lost when the computer is turned off.
* **Example**: DDR4 RAM in PCs.

**Secondary Storage**

* **Description**: These devices provide long-term data storage for the operating system, applications, and files.  
  These devices are non-volatile, meaning data is not lost when the computer is turned off.
* **Examples**: Hard Disk Drives (HDD), Solid-State Drives (SSD), USB Flash Drives.

**Make a block diagram of computer architecture. Briefly explain the function of each component. 4 + 6 = 10 marks**

**What are the different layers in Open Systems Interconnection (OSI) reference model? Provide a brief description of each layer. 3+7=10 marks**

**What is internet and intranet? Explain the different types of security issues related to the use of internet. Briefly explain the techniques/tools used to safeguard IT system. 3+4+3=10 marks**

Definition of Internet

The internet is a global network of interconnected computers that allows information and communication to be exchanged across the world.

**Features**:

* **Accessibility**: Open to everyone, anyone can access it.
* **Authentication**: Not required.
* **Examples**: Websites like Google, Facebook.

Definition of Intranet

The intranet is a private network used within an organization to share information and resources with authorized users only.

**Features**:

* **Accessibility**: Restricted to authorized users within the organization.
* **Authentication**: Required for access.
* **Examples**: Company portals, internal employee networks.

**What is Database Normalization? Why do we need to normalize database? Explain with example. 3 + 7 = 10 marks**

**Database Normalization**

Database normalization is the process of organizing the columns and tables in a database to minimize redundancy and dependency. It involves breaking down large tables into smaller, more manageable tables and ensuring that the relationships between these tables are well-defined.

**Main Goals:**

1. **Eliminates Redundant Data:** Reduces duplicate information in the database.
2. **Reduces Errors:** Minimizes the chance of mistakes.
3. **Simplifies Maintenance:** A well-organized database is easier to manage and update.

**Need for Normalizing a Database**

1. **Reduce Data Redundancy:**  
   When we have repeated data in multiple tables, it takes up extra space and increases the risk of errors. Normalization helps by storing the data in one location, reducing duplication.
2. **Data Integrity:**  
   Normalization organizes data logically, reducing the chances of anomalies (insert, update, and delete operations) that could lead to data corruption.

* **Unnormalized Data Example:** If a customer's address changes, it must be updated in every order record. This increases the chance of errors and inconsistencies, which could result in incorrect reports and decisions.
* **Normalized Data Example:** Storing the customer's address in a separate customer table allows updating it in one place, ensuring consistency across all orders and minimizing errors.

1. **Improve Query Performance:**  
   Normalization breaks down large tables into smaller, more manageable tables, making it easier and faster to search for and retrieve information.
2. **Simplified Maintenance:**  
   With less repeated/ redundant data, it’s easier to manage tasks such as updating, deleting, and inserting data without causing errors.

Examples of Database Normalization

A screenshot of a computer

Description automatically generated

**First Normal Form (1NF)**

To Normalize to 1NF, split the repeating groups into separate rows.

A screenshot of a computer

Description automatically generated

**Second Normal Form (2NF)**

To normalize to 2NF, split the table into two: one for customer details and one for order details

A white rectangular object with black text

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A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

**Third Normal Form (3NF)**

To normalize to 3NF, split customers tables into smaller table to remove dependency

A screenshot of a computer

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**You have to develop an electronic attendance system for an organization with 1000+ employees located at 40 branches in Kathmandu Valley. Explain the system development lifecycle and type of programming language and platform you would implement. 10 marks**

**What are the advantages of electronic payment system? How has Core Banking System. Mobile Banking and Digital Wallets revolutionized the banking and e-commerce sector? 3+7=10 marks**

**Define different e-commerce models with suitable example. Explain the business benefits and limitations of B 2 B Model. 6 + 4 = 10 marks**

**Describe the role of Digital Signature for secure online transactions. What are the need and benefits of application of IT in banking sector? 5+5=10 marks**

**Describe about the information security Education as provisioned in current NRB IT Guidelines. 5 marks**

**What do you mean by database? Distinguish between intranet and extranet. 5 marks**

**How do you differentiate between fragmentation and segmentation in memory management? Write down. 5 marks**

**What is storage device? Write down the types of storage device.**

**1.5 + 3.5 = 5 marks**

### ****Definition of Storage Device****

A **storage device** is a hardware component used to store, retrieve, and manage data in a computer system. It can be either primary storage or secondary storage. Primary storage is fast memory used for active processes, while secondary storage is used for long-term data storage.

### ****Different Types of Storage Devices****

#### **Primary Storage Device**

1. **Cache Memory**
   * **Description**: A small, fast memory placed between the CPU and main memory to store frequently accessed data.
   * **Example**: L1, L2, L3 Cache in processors.
2. **Main Memory (RAM)**
   * **Description**: Volatile memory used to store data and instructions currently in use by the CPU.
   * **Example**: DDR4 RAM in PCs.

#### **Secondary Storage Device**

1. **Hard Disk Drive (HDD)**
   * **Description**: A traditional storage device that uses magnetic spinning disks to read and write data, offering large storage capacity.
   * **Example**: HDD used for storing operating systems, applications, and user data.
2. **Solid State Drive (SSD)**
   * **Description**: A fast storage device that uses flash memory to store data, providing lower power consumption.
   * **Example**: SSD used in modern laptops and desktops.
3. **Cloud Storage**
   * **Description**: A service that allows users to store and access data remotely over the internet, providing data backup.
   * **Example**: Services like Google Drive, Dropbox, and iCloud.

**What are the functions of operating system? Write short note about permission for users on Linux. 3+ 2 = 5 marks**

**User Permissions in Linux**  
Permissions determine who can access files or directories and what actions they can perform.  
Below are the permissions for users:

1. **Owner**: The user who created the file or directory.
2. **Group**: A group of users who share the same permission for files or directories.
3. **Others**: All other users who are not the owner or part of the group.

**Permissions include**:

* **Read (r)**: Allows viewing the contents of files or directories.
* **Write (w)**: Allows modifying the contents of a file or directory.
* **Execute (x)**: Allows executing a file (program/script) or accessing a directory.

**How does OSI reference model differ with TCP/IP reference model? 5 marks**

1. **Number of Layers**

* **OSI Model**: There are 7 layers: Application, Presentation, Session, Transport, Network, Data Link, and Physical.
* **TCP/IP Model**: There are 4 layers: Application, Transport, Internet, and Network Interface.

1. **Layer Representation**

* **OSI Model**: It has a separate Presentation and Session Layer.
* **TCP/IP Model**: It combines the Presentation and Session layer into a single Application layer.

1. **Development**

* **OSI Model**: Developed by OSI (International Organization for Standardization).
* **TCP/IP Model**: Developed by DoD (Department of Defense).

1. **Usage**

* **OSI Model**: A conceptual model used for network understanding.
* **TCP/IP Model**: A practical model used in actual networking.

1. **Protocol Dependency**

* **OSI Model**: Protocol dependent, which means each layer has its own set of protocols for handling data.
* **TCP/IP Model**: Protocol independent, which means each layer can work with different protocols as required.

**What is data compression? Differentiate between lossy data compression and lossless data compression 2+3=5 marks**

**Why do we need Normalization? Explain with examples. 5 marks**

**Describe basic computer architecture. 5 marks**

**Differentiate and elaborate physical security of IT infrastructure and digital security. 5 marks**

**How does proxy serve work? Explain. 5 marks**

**What is RAID? Explain. 5 marks**

**What is software? Explain the types of software with examples. 5 marks**

**Write down the threats of social media in short. 5 marks**

**What is internet? Differentiate intranet and extranet with example. 5 marks**

**Briefly analyze the contribution of stock market in mobilizing resources for the development of Nepal also provide practical suggestions to enhance the role of capital market to raise the growing investment for realizing the aspiration of prosperous Nepal. 4 + 6 = 10 marks**

**What is the Central Processing Unit (CPU)? Explain how CPU, memory and input/output devices work together with the help of a block diagram. 1+4=5 marks**

Definition of central processing unit

The CPU is the brain of the computer. It performs all the calculations, executes instructions, and manages the data flow within the system.  
**Components**: It consists of the Control Unit (CU), Memory Unit/Register, Arithmetic Logic Unit (ALU).  
**Examples**: Intel i7, AMD Ryzen.

Diagram: Block Diagram of Digital Computer System

**How CPU, Memory and Input/Output devices work together**

**Input: Data and instructions are entered through input devices (e.g., keyboard, mouse) and stored in memory.**

Instruction Fetch: The Control Unit fetches the instruction from memory.

Instruction Decode: The Control unit decodes these instructions to understand what actions need to perform.

Instruction Execution: The Control unit signals to the other components of the CPU (like ALU) to execute the instructions.

Store: The results of the calculations are stored in memory.

Output: The results are displayed on output devices (e.g., monitor, printer) for user.

**What do you mean by networking? Differentiate between internet and intranet. 2+3=5 marks**

**Explain various types of computer viruses which give threats for the computer system? What are the protective techniques from such threats? 5 marks**

**What is a database? Discuss the various services provided by a Database Management System. 2+3=5**

**What is computer networking? Compare between LAN and WAN. 5 marks**

**A screenshot of a computer network

Description automatically generated**

**Highlight the important features of Electronic Transaction ACT, 2063. 5 marks**

**Explain various types of computer viruses which give threats for the computer system? What are the protective techniques from such threats?**

**5 marks**

Types of Computer Viruses

**Types of Computer Viruses**

**1. File Viruses:**  
They attach to executable files (e.g., .exe, .com, .bat), spread when the infected file is executed, and can damage or delete files.

**2. Boot Sector Virus:**  
These viruses infect the master boot record (MBR) of storage devices like hard disk drives, floppy disks, or USB drives. They activate when the system boots and can cause data corruption, unauthorized access, and other malicious activities.

**3. Worms:**  
They are self-replicating malware that spreads across networks without needing to attach to a file. They can consume system resources and perform other malicious activities.

**4. Trojan Horse:**  
They are malware that looks like legitimate software, tricking users into installing it. Once installed, it can steal data, create backdoors for hackers, or perform harmful actions without the user’s knowledge.

**5. Macro Virus:**  
They infect programs like Microsoft Word or Excel by taking advantage of their macro features to run malicious code. It spreads when an infected document or email attachment is opened.

**Draw the basis block diagram of a computer and explain about all blocks with suitable examples. 5 marks**

**What is an Operating System? Explain various kinds of operating System. 5 marks**

**What is primary key and foreign key in database. Clarify it with examples. 5 marks**

**Primary Key**

* **Definition:** A primary key uniquely identifies each record in a table.
* **Features:**
  1. It cannot have null values.
  2. Each table has only one primary key.
  3. It must be unique for each record.
* **Example:** Consider a table **Student**:

A screenshot of a computer

Description automatically generated

In this example, studentID is the primary key. Each student has a unique studnetID and no two students can have the same ID.

**Foreign Key**

* **Definition:** A foreign key is a column in one table that is linked to the primary key of another table.
* **Features:**
  1. It is used to represent a relationship between tables.
  2. It can contain duplicate values.
  3. It can contain null values.
  4. A table can have multiple foreign keys.
* **Example:** Consider a below table:

A diagram of a course and study

Description automatically generated

Here,

* StudentID in the student\_mark table is a foreign key. They reference the primary keys StudentID in the student\_detail table.
* This relationship ensures that only valid students (from the student\_detail table) can be assigned to student\_mark table.

**What is DBMS? Explain about various keys in DBMS. 1 + 4 = 5 marks**

**Types of Keys in DBMS**

In a database, keys help to link data in different tables and ensure that relationships are correctly set up.

1. **Primary Key**  
   **Definition:** A primary key uniquely identifies each record in a table.  
   **Features:** It cannot have null values, and each table can have only one primary key.  
   **Example:** In a “Student” table, the “StudentId” can be a primary key.
2. **Foreign Key**  
   **Definition:** A foreign key is a column in one table that is linked to the primary key of another table.  
   **Features:** It is used to represent a relationship between tables.  
   **Example:** In the “Course” table, “StudentId” can be a foreign key that links to the “Student” table primary key.
3. **Candidate Key**  
   **Definition:** A candidate key is a set of one or more columns that can uniquely identify each record in a table.  
   **Features:** A table can have multiple candidate keys, but only one is selected as the primary key.  
   **Example:** In the “Employee” table, both “EmployeeId” and “Email” can be candidate keys.
4. **Super Key**  
   **Definition:** A super key is a set of columns that can uniquely identify each record in a table. It can have extra columns that are not necessary for uniqueness.  
   **Example:** A combination of “StudentId” and “StudentName” could be a super key in the “Student” table.
5. **Alternate Key**  
   **Note:** A candidate key is a column or a set of columns that can uniquely identify a record in a table.  
   **Note:** The primary key is the candidate key that is selected to uniquely identify records.  
   **Definition:** The alternate key is any candidate key that is not selected as the primary key but can still uniquely identify a record.  
   **Example:** If “Email” is a candidate key but “EmployeeId” is selected as the primary key, then “Email” becomes an alternate key.
6. **Composite Key**  
   **Definition:** A composite key is made up of two or more columns used together to uniquely identify a record. It is used when no single column can uniquely identify a record.  
   **Example:** In the “Transaction” table, a combination of “CustomerId” and “BankId” could be a composite key.
7. **Unique Key**  
   **Definition:** A unique key ensures that all values in a column or set of columns are unique. It allows null values (but only one null is allowed in each column).  
   **Example:** In the “Transaction” table, “Email,” “MobileNumber,” and “PinNo” can be unique keys.

**Explain the basic features of electronic Transaction Act, 2063 of Nepal. Why Electronic Transaction Act, 2063 of Nepal. Why is Electronic Transaction Act required? 4+1=5 marks**

A table with numbers and letters

Description automatically generated

**Write “Windows” as an OS. Write down the steps of copying a file or program in windows OS. 5 marks**

**Definition of Windows OS**

Windows is a widely used graphical operating system developed by Microsoft. It provides a user-friendly interface that allows users to interact with their computers through icons, menus, and windows. Windows is designed to run on personal computers, laptops, and servers, and it supports a broad range of software and hardware. Key features of Windows include file management, memory management, device management, and multitasking.

**To copy a file or program in Windows OS, follow these steps:**

1. **Locate the File/Program**  
   • Open **File Explorer** by clicking on the file explorer or using the shortcut key **Windows + E**.  
   • Navigate to the location of the file or program you want to copy.
2. **Select the File/Program**  
   • Click on the file or program you want to copy.  
   • If you want to copy multiple items, hold down the **CTRL** key and click on each item.
3. **Copy the File/Program**  
   • Right-click on the selected file(s)/program and choose **Copy**.  
   • Or you can press **CTRL + C** to copy the selected files.
4. **Navigate to the Destination Location**  
   • Navigate to the location where you want to paste the copied file/program.
5. **Paste the File/Program**  
   • Right-click on the destination location and choose **Paste**.  
   • Or you can press **CTRL + V** to paste.

**List any three-web designing software. Highlight the merits of the web designing software that you are familiar with. 5 marks**

**Three Web Designing Software:**

1. Figma
2. WordPress
3. Wix
4. Shopify

**Merits of Figma (Web Designing Software):**

1. **Real-Time Collaboration**  
   Figma allows multiple users to work on the same project simultaneously in real time. This makes teamwork collaboration easier and reduces the need for file sharing.
2. **Cloud-based Platform**  
   Figma is a cloud-based platform tool, which means you can use it from anywhere through a web browser. You don’t need to install any software to use it.
3. **Cross-Platform Compatibility**  
   Figma works on major platforms like Windows, macOS, and Linux because it runs in a web browser. This makes it easy to use on any device, no matter the operating system.
4. **Design for Various Platforms**  
   Figma allows you to design for various platforms like websites, mobile apps, and desktop applications.
5. **Large Community and Plugins**  
   Figma has a large community of users and a wide range of plugins available.

**What do you mean by multimedia? Briefly illustrate any five types of media used in multimedia. 5 marks**

**Here are five types of media used in multimedia technology:**

**Text**

* **Features:** Text includes written content like articles, captions, titles, labels, and any other on-screen text. Text is often used to provide information for other media.
* **Example:** e-books, online articles, subtitles in videos, text descriptions in images.

**Image**

* **Features:** Images are still photos, drawings, or graphics. They are used to represent ideas, concepts, or make the content more visually engaging.
* **Example:** Diagram to explain a lesson, product images in advertisements, icons and banners on websites.

**Audio**

* **Features:** Audio is a sound element like music, voice, or sound effects that adds depth to multimedia content. It helps create emotions, enhance atmosphere, and provide information through audio.
* **Example:** Podcasts, audiobooks, background music in videos, sound effects in games.

**Video**

* **Features:** Video combines moving images and sound to create dynamic content. It is used to show real-life events, create animations, making it an engaging way to share information.
* **Example:** Tutorial videos, movie clips, video advertisements, social media videos.

**Animation**

* **Features:** Animation is a way of showing movement by quickly displaying a series of images. It helps tell stories or make content interactive and fun.
* **Example:** Cartoons, animated videos, learning videos with animations.

**What is the significance of Utility Software? List any two-utility software by application types and briefly explain their uses? 5 marks**

### ****Significance of Utility Software****

* **System Maintenance:** It helps to optimize computer performance, manage disk space, and fix errors.  
  **Example:** CCleaner, Disk Cleanup (Built-in)
* **Security:** Antivirus software protects the system from malicious activities and cyber threats.  
  **Example:** Windows Defender (Built-in), Avast

### ****Two Examples of Utility Software by Application Types****

#### **Application Type: Security**

1. **Antivirus Software**
   * **Use:** Antivirus software protects the system from malicious activities and cyber threats.
   * **Example:** Windows Defender (Built-in), Avast
2. **Backup and Recovery Software**
   * **Use:** This software allows users to back up critical data in case of system failure.
   * **Example:** Windows Backup and Restore (Built-in), BackupAssist

#### **Application Type: System Management**

1. **Data Management**
   * **Use:** It is about organizing files, creating backups, and recovering lost data.
   * **Example:** Microsoft OneDrive, Google Drive
2. **File Management**
   * **Use:** This software helps organize files, search for specific ones, and manage file permissions.
   * **Example:** File Explorer (Built-in), Total Commander

**Write a short note on e-Governance development in Nepal. 5 marks**

**What is utility Software? What are the functions of utility software? 5 marks**

1)System Maintenance:

2)Security: protect

3)Data Management:

4) File Management:

5)Backup and Recovery:

**Differentiate between windows operating system and disk operating system environment? 5 marks**

Here Disk Operating System means MS-DOS

A screenshot of a computer program

Description automatically generated

**Mention the types of graphical packages and its uses. 5 marks**

**Define database. Mention some data base packages. 5 marks**

Database Packages

1)Microsoft SQL Server

A commercial relational database management system (RDBMS) developed by Microsoft. They are commonly used by businesses to store and manage huge amount of data.

2)PostgreSQL

They are free and open-source database system which is known for its advanced features like support for complex queries and large amount of data.

3)MySQL

They are widely used, free database system known for fast, reliable, and easy to use.

4)Oracle Database

A powerful, commercial RDBMS used by large organizations for storing and managing vast amount of data. It’s offers advanced features like data integrity and security.

5)MongoDB

They are popular NoSQL database system that stores data in flexible format, using documents instead of traditional table structure. This makes it easier to store different types of data without a strict structure.

**How does Operating system differ from the application software? Explain 5 marks**

A screenshot of a computer software

Description automatically generated

**Classify the Graphical packages and state their applications. 5 marks**

Graphical packages can be classified into several categories based on their functionality and how they are used. Below are the applications:

1. **Image Editing Software**  
   **Examples**: Adobe Photoshop, Fotor, Canva, Figma  
   **Applications**:
   * Used for creating and manipulating **raster images** (pixel-based).
   * Widely used in **advertising**, **digital marketing**, and **photography**.
2. **Vector Graphics Software**  
   **Examples**: Adobe Illustrator, Figma  
   **Applications**:
   * Used for creating and manipulating **vector graphics** rather than pixels.
   * Commonly used in **logo design** and **web design**.
3. **3D Graphics Software**  
   **Example**: Blender  
   **Applications**:
   * Used for creating **three-dimensional models**, **animations**, and **simulations**.
   * Used in **animation**, **video games**, and **virtual reality** (VR).
4. **Web Design and Development Tools**  
   **Examples**: Figma, Adobe XD  
   **Applications**:
   * Used for creating and designing **websites** and **web applications**.
   * Widely used in **UI/UX design** for designing user interfaces and experiences.
5. **Computer-Aided Design (CAD) Software**  
   **Example**: AutoCAD  
   **Applications**:
   * Used for creating **2D and 3D designs** for **construction**, **architecture**, and **mechanical design**.

**State the major concerns about computer crime and privacy on the increasing use of internet in the business? How do you think we should solve the current scenario? 5 marks**

**The Increasing Use of the Internet in Business and Concerns Regarding Computer Crime and Privacy**

**Data Breach and Cyberattacks**  
Attackers can break into systems to steal sensitive information like customer data and financial records. They may also use ransomware to encrypt important data and demand payment for its release.

**Data Privacy**  
Businesses collect a lot of personal and financial data, which can be at risk of unauthorized access and misuse. If this data is exposed, it can lead to financial losses and damage to the company's reputation.

**Intellectual Property Theft**  
Businesses store valuable intellectual property (IP) online, making it vulnerable to unauthorized access. Attackers may steal important assets like trade secrets or proprietary software, which can hurt the company’s ability to stay competitive.

**Strategies for a Secure Digital Future:**

1. **Firewall Implementation**
   * Firewalls should be configured to inspect incoming and outgoing data packets, allowing safe packets while blocking suspicious threats.
2. **Access Control**
   * Assign roles and permissions to users, ensuring that only authorized users can access sensitive data.
3. **Data Encryption**
   * Encrypt sensitive data during transmission to prevent unauthorized access.
4. **Training**
   * Provide cybersecurity training to users to protect them from threats like phishing attacks and social engineering. Teach them to use strong passwords and avoid clicking on links or downloading from malicious websites.
5. **Backup and Data Recovery**
   * Ensure that all critical data is backed up regularly and implement a data recovery plan to minimize downtime in case of system failure or security breach.

**What do you mean by operating system? Mention the features of windows operating system. 5 marks**

 **User Interface**  
Windows provides a user-friendly graphical interface with icons, menus, and a taskbar, allowing users to interact with the system.

 **Multitasking**  
Windows allows users to run multiple applications simultaneously, increasing productivity and efficiency.

 **File Management**  
Windows provides a file explorer for organizing, accessing, and managing files and folders easily.

 **Security**  
Windows provides various security features such as built-in firewalls, Windows Defender, and user account controls to protect the system from malicious activities and unauthorized access.

 **Device Support**  
Windows supports a wide range of hardware devices, including printers, scanners, and webcams, making it easy to connect and use them with the computer.

**What is internet? What additional support internet can offer in the current context of Nepal Rastra Bank Operation? 5 marks**

**What is backup and recovery? How can you recover the file which is in the recycle bin? Is there any way to permanently delete the file without keeping in the recycling bean? 5 marks**

**Backup Definition**  
Backup is the process of creating copies of important data or files to protect them against loss due to hardware failure, accidental deletion, or cyber-attacks.

**Recovery Definition**  
Recovery is the process of restoring data from these backups when the original files are lost or damaged.

**Recovering Files from the Recycle Bin**

1. Open the Recycle Bin on your desktop.
2. Find and select the file you want to restore.
3. Right-click on the file and choose the option **Restore**. The file will return to its original location.

**Permanently Deleting a File**

1. Select the file and press **Shift + Delete** on the keyboard.
2. Confirm the action.

**State the major concerns about computer crime and privacy on the increasing use of internet in the business? How do you think we should be moving ahead in the current scenario? 5 marks**

**What are the applications of WINZIP? 5 marks**

**Categories of SQL Commands**

1. **Data Definition Language (DDL)**  
   **Definition:** Define the structure of the database, including tables, views, indexes, data types, relationships, and constraints.  
   **Operations:** CREATE, ALTER, DROP, TRUNCATE
2. **Data Manipulation Language (DML)**  
   **Definition:** It allows the user to perform operations such as inserting, updating, deleting, or retrieving data from the database. These operations are achieved through SQL (Structured Query Language).  
   **Operations:** INSERT, UPDATE, SELECT, DELETE
3. **Data Query Language (DQL)**  
   **Definition:** It allows the user to retrieve specific information from the database.  
   **Operations:** SELECT

**Data Control Language (DCL)**  
**Definition:** It manages user permissions, ensuring that only authorized users can perform certain operations on the database.  
**Operations:** GRANT, REVOKE

 What is a computer? Differentiate between Analog and Digital Computer.

 Explain the concept of RAM and cache memory. Write the types of cache memory.

 What is a control panel in Windows operating system? List down the tasks that you can perform through control panel.

 What do you mean by file and folder? Write the types of files and file extensions.

 What is an operating system? Describe its functions and classifications.

 Define a database. What are the various services provided by DBMS?

 What is social media? How can government organizations utilize social media platforms to improve service delivery? Explain.

 Provide a comparison between Hub, Switch, and Router.

 What is the use of firewall in network security? Differentiate between IDS and IPS in network security management.

 What is BIOS? Explain the major features and settings available in BIOS.

 State the roles of Department of Information Technology.

 In today's world, what are the various types of security threats to the systems, data, and users? What are the safeguards and prevention mechanisms that need to be implemented in order to keep the data safe from them?

 Mention any 5 strategies about how they contribute to achieving the objectives of ICT Policy, 2020.

Here is the extracted text from the image:

1. What are the differences between RAM, ROM, and Cache Memory in a Computer System?
2. Describe the major functions of an Operating System.
3. What are the different types of system tools provided by Windows OS for improvement of system performance? Explain.
4. What do you mean by DBMS? Write down the features of DBMS in data management and security.
5. What do you mean by formatting and validating field data in DBMS? Explain with a suitable example.
6. Define IP Address and Subnet Mask in computer networking. How do you find the IP Address and Subnet Mask of your computer and network?
7. Explain the following terms: a) Phishing b) Identity and Access Control
8. Differentiate between firmware and cache memory.
9. What do you understand by a software? Explain its types.
10. What do you mean by system tools in operating system? Briefly explain about disk defragmenter and restore tools of Windows OS 1 + 4
11. Explain the generation of Computer with key features of every generation in detail 10 marks
12. What is primary and foreign key in database. Clarify it with examples.
13. What is formatting and validating field data in database management system? Give an example to illustrate.
14. Define IP address, subnet mask and default gateway.
15. What is cyber security? What are the various common security threats? 2+3
16. Discuss the functions, duties and powers of controller as per Electronic Transaction Act.
17. Explain about various security mechanisms in detail. 10 marks

<https://sarkarijagir.com/question-paper-of-computer-operator-sansad-sewa-of-psc-second-paper-2080/>

<https://www.oppravakar.com.np/2022/08/computer-operator-question-loksewa-2080.html>

<https://www.oppravakar.com.np/2023/09/loksewa-civil-service-computer.html>

<https://www.oppravakar.com.np/2024/04/2081-01-08-pradesh-loksewa-computer_72.html>

<https://www.oppravakar.com.np/2024/03/model-set-8-computer-operator.html>

<file:///C:/Users/Lenovo/Downloads/Documents/Nepal-Rastra-Bank-Assistant-4th-IT-Second-Paper-Open-2078.pdf>

1) Here can i get full 5 marks form this answer 2) if not then show me with correciton and mofification 3) if extra ansewer is present then show me with modification and remove that one

here just format this above so that i can directly paste inot ms wordpad for my exam study without changinag contenet