PART-II

Section-I

Question No. 4

a) Define the following:
Pesticides, Herbicides, Insecticides, Ceramics, and Green House Effect.

- **Pesticides:-**

Pesticides are substances that are meant to control pests. They kill, repel, or control forms of animal and plant life considered to damage or be a nuisance in agriculture and domestic life.

Examples:-

Examples of pesticides are:

(i) Metaldehyde
(ii) Boric Acid
(iii) Glyphosate

- **Herbicides:-**

Herbicides, also commonly known as weed killers, are

substances used to control undesired plants, also known as weeds. They are the chemicals used to manipulate or control undesirable vegetation.

Examples:-

Examples of herbicides are:

(i) Diclofop
(ii) Dinoseb
(iii) Paraquat

- ## Insecticides:-

Insecticides are chemicals used to control insects by killing them or preventing them from engaging in undesirable or destructive behaviors.

Examples:-

Examples of insecticides are:

(i) Ovicides
(ii) Larvicides

- ## Ceramics:-

A ceramic is any of the

various hard, brittle, heat-resistant, and corrosion-resistant materials made by shaping and then firing an inorganic, non-metallic material such as clay, at a high temperature.

Examples:-

Examples of Ceramics are:

(i) Earthenware

(ii) Porcelain

- ## Green House Effect:-

Green House Effect is a process that occurs when gases in Earth's atmosphese trap the Sun's heat. The Green House Effect is one of the things that makes Earth a comfortable place to live.

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b) Explain the bonding in water molecule.

What is Bonding?

Chemical bonding refers to the strong electrical force

of attraction between atoms and ions in the structure. Atoms make bonds in order to fulfil their valence orbits.

Bonding in Water Molecule:-

The water molecule has unique bonding properties. The bonding in the molecule is covalent meaning that the atoms share electrons. The bonding in water molecule is explained below:

(i) Composition:-

A water molecule consists of two hydrogen atoms and one oxygen atom. Oxygen is more electronegative than hydrogen, it means it has a greater tendency to attract electrons.

(ii) Covalent bonds:-

Each hydrogen atom in water molecules forms covalent bond by sharing its one electron with the oxygen atom. While oxygen-

hydrogen bonds are polar covalent bonds because of the difference in electronegativity between oxygen and hydrogen.

(iii) Polarity :-

Due to higher electronegativity of oxygen, the shared electrons spend more time closer to oxygen. This results in partial negative (denoted as $-\delta$) charge on oxygen while partial positive (denoted as $+\delta$) charge on hydrogen atoms.

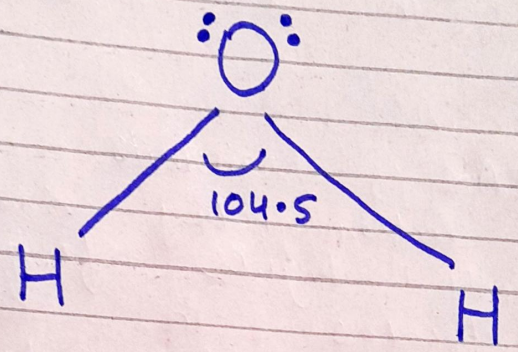
(iv) Geometry of molecule:-

The water molecule has bent V-shaped geometry due to the repulsion between the lone-pairs of electrons on the oxygen atom.

(v) Cohesion and Adhesion:-

Cohesion refers to the attraction between molecules of same substance. Water molecules exhibit strong cohesion due to hydrogen bonding, leading to properties like surface tension.

While adhesion refers to the attraction between molecules of different substances. And water can adhere to other surfaces.



Water Molecule

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c) What types of waves are used in RADAR, SONAR, LIDAR, Mobile Phone and Thermistors?

- **RADAR Waves:-**

RADAR system transmits electromagnetic waves especifically radio waves. These waves do not require any medium to travel. They can travel in vacuum.

- **SONAR Waves:-**

A SONAR uses ultrasonic waves to detect and locate objects under water. It is a technology used to detect obstacles in a path.

- **LIDAR Waves:-**

LIDAR transmits and receives electromagnetic radiation but at higher frequencies. LIDAR operates in the ultraviolet, visible and infrared region of the electromagnetic spectrum.

- **Mobile Phone Waves:-**

Mobile phones communicate by transmitting radio waves through a network. The waves are specifically radio-frequency waves which transmit signals from speaker to listener.

- **Thermistors:-**

A thermistor is a temperature sensor that relies

on the temperature-dependent electrical resistance of certain materials. It does not use waves in the traditional sense, instead it utilizes the electrical properties of materials.

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d) What are advantages and disadvantages of AI?

What is Artificial Intelligence :-

Artificial Intelligence or AI refers to the stimulation of human intelligence in machines that are programmed to think and learn like humans. The goal of AI is to create systems that can perform tasks that typically require human intelligence.

Advantages of Artificial Intelligence :-

The advantages of

Artificial Intelligence are:

(i) **Automation and Efficiency:-**
AI systems can automate repetitive tasks, leading to increased efficiency and productivity.

(ii) **Data Analysis :-**
AI has the ability to analyze vast amounts of data quickly and derive meaningful insights.

(iii) **Cost Reduction :-**
By automating tasks and improving efficiency, AI can contribute to cost reduction in various industries.

(iv) **Medical Advancements:-**
AI is playing a crucial role in healthcare, aids in diagnosis, drug discovery, and personalized medicines.

(v) **Innovation and Research:-**
AI contributes to

advancements in various scientific and research fields.

Disadvantages of Artificial Intelligence:-

While Artificial Intelligence has numerous advantages, it also comes with certain disadvantages. These are:

(i) Job Displacement:-

Automation and AI technologies can lead to the displacement of certain jobs as machines take over routine and repetitive tasks.

(ii) Lack of Creativity:-

AI lacks human qualities such as creativity, intuition, and emotional understanding.

(iii) Privacy Concerns:-

The use of AI in surveillance, facial recognition, and data analysis raises

concerns about privacy infringement.

(iv) High Initial Costs:-

Implementing AI technologies often require significant upfront investments in infrastructure, expertise, and training.

(v) Social Impact:-

AI can contribute to social inequality if access to and benefits from AI technologies are not distributed equitably.

Question No. 5

a) Draw a block diagram of input and output devices of a Computer?

Input Devices of Computer:-

Those devices which permit the computer to communicate with the user, are called input devices.

These devices are:

(i) Keyboard
(ii) Pointing Devices
(iii) Mouse
(iv) Joystick
(v) Scanning Devices.

Output Devices of Computer:-

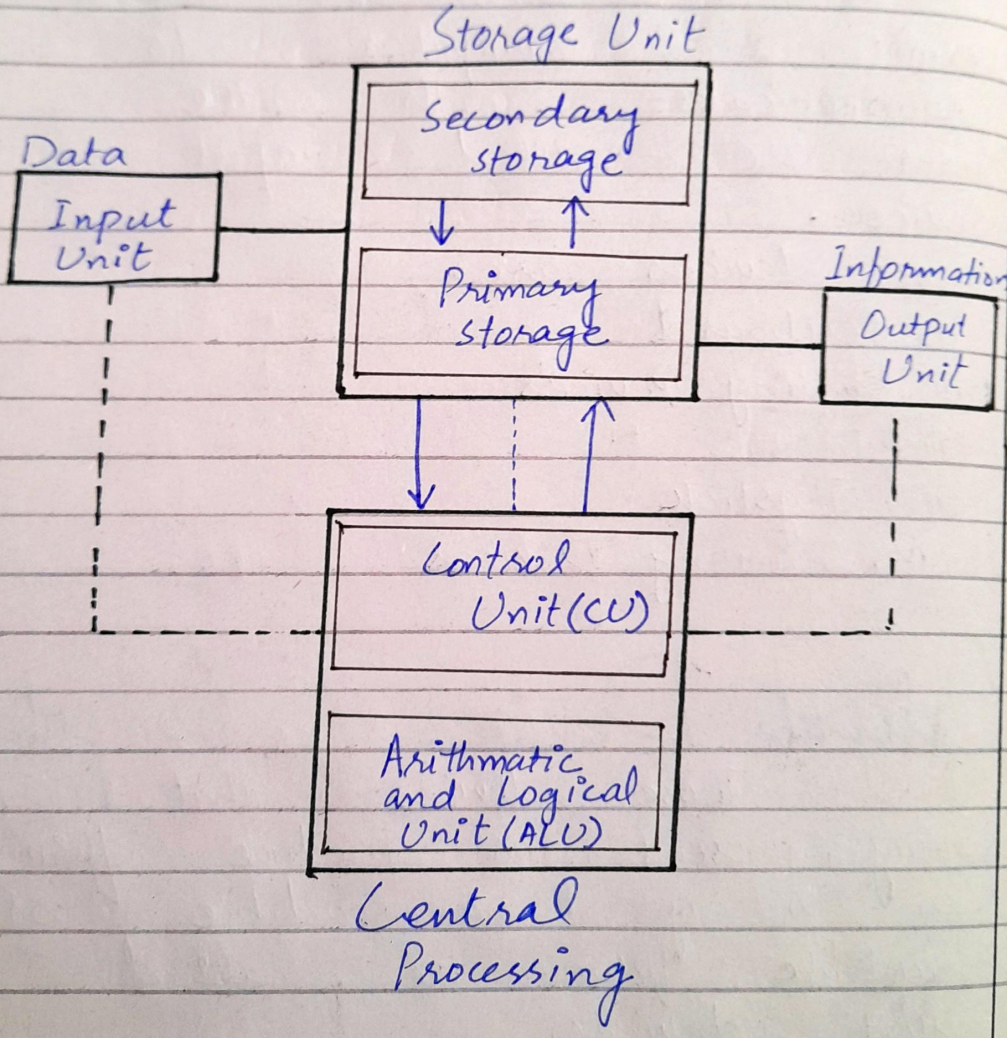
Those devices that display, present, or produce information in a human-readable or perceptible form, are called output devices.

These devices are:

(i) Monitor
(ii) Projector

(iii) Printer
(iv) LCD
(v) Plotter

Block Diagram of Input and Output Devices:-



b) Define optics. How does an optical fiber work?

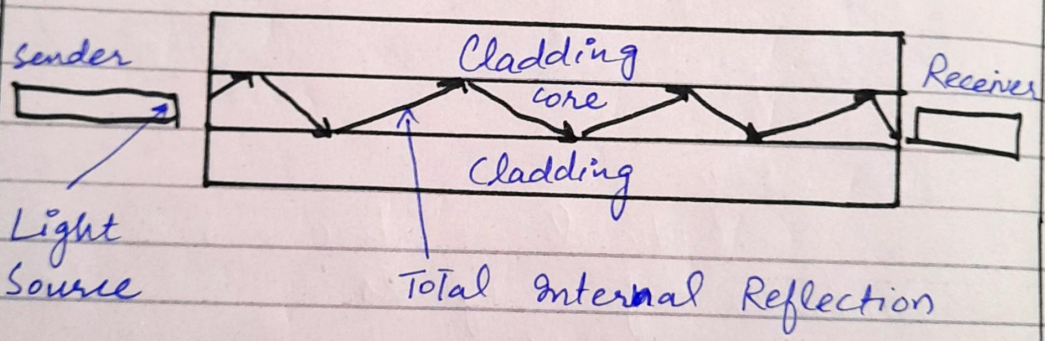
Definition of Optics:-

Optics is the branch of physics that deals with the study of light and its interactions with matter. It encompasses the behavior, properties, and nature of light, as well as the instruments and devices that manipulate or detect light.

Working of an Optical Fibre:-

Optical Fibre involves transmission of signals in the form of light from one point to the other. Furthermore, fibre optic communication network consists of transmitting and receiving circuitory, a light source and detector devices. When the input data, in the form of electrical signals, is given to the transmitter circuitory, it converts them into

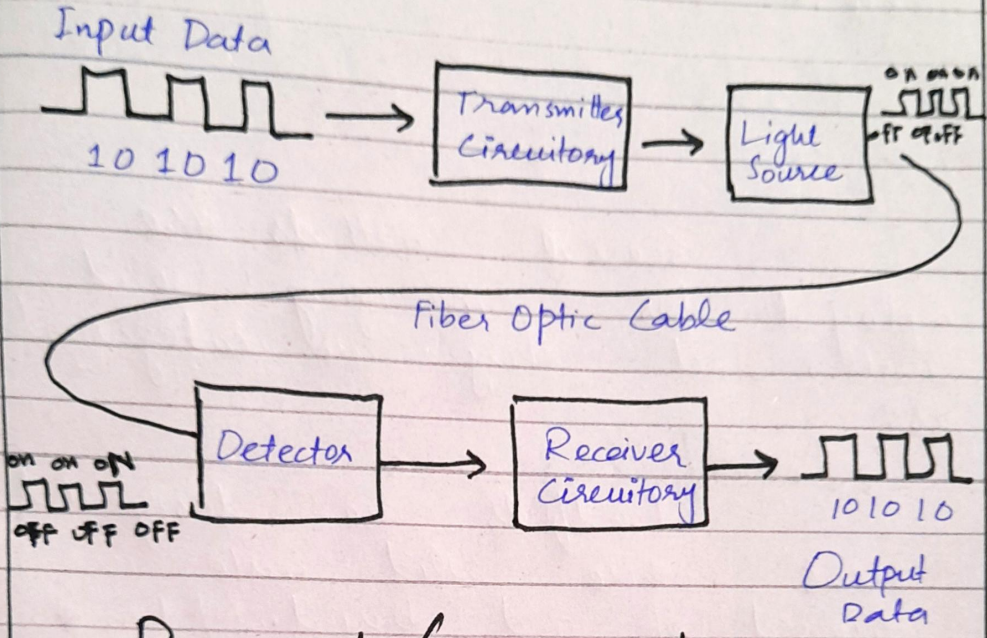
light signals with the help of light source. This source is of LED whose amplitude, frequency and phases must remain stable and free from fluctuation in order to have efficient transmission. The light beam from the source is carried by fibre optic cable to the destination circuitory wherein the information is transmitted back to the electrical signal by a receiver circuit.



Fibre Optic Communication

The Receive circuit consists of a photo detector along with an appropriate electronic circuit, which is capable of measuring magnitude, frequency and phase of the optic field. This type of communication uses wavelength near to

infrared band that are just above visible range.



Process of Communication Through Optical Fibre

(c) Discuss different methods of Solid Waste Management.

Solid Waste Management:-

Solid Waste Management refers to the systematic management of generation, collection,

transfer, of treatment, recycling, recovery, and disposal of solid waste.

Methods of Solid Waste Management :-

Several methods are employed for managing solid waste, and they are categorized as:

(i) Landfills :-

Landfills are designated areas where solid waste is disposed of and buried. Modern landfills are designed with liners to prevent leachate (contaminated liquid) from entering soil and groundwater.

(ii) Incineration :-

Incineration involves the controlled burning of solid waste to convert it into ash, gases, and heat. Energy can be recovered from incineration process, and the volume of waste is significantly reduced.

(iii) Composting:-

Composting is the biological decomposition of organic waste into nutrient rich compost. It is environmentally friendly method that reduces the volume of organic waste, improves soil quality, and mitigates greenhouse gas emissions.

(iv) Recycling:-

Recycling involves the collection and processing of materials such as paper, glass, plastic, and metal to produce new products. It conserves resources and reduces energy consumption.

(v) Biological Treatment:-

Biological treatment methods, such as anaerobic digestion and fermentation, breakdown organic waste through microbial action.

d) Distinguish GPS and GIS?

Distinguish between GPS and GIS :-

Following is the difference between GPS and GIS.

• GPS :-

GPS stands for Global Positioning System.

(i) Definition :-

A satellite based navigation system that enables users to determine their precise location anywhere on earth.

(ii) Function :-

It determines the precise location of an object in the space.

(iii) Dependency :-

Global Positioning System is based on satellites.

(iv) Output :-

It coordinates with geography (earth) to find the location of objects.

(v) Example :-

The example of GPS is Navigation, location tracking.

- GIS :-

GIS stands for Geographic Information System.

(i) Definition :-

A system that captures, stores, analyzes, and displays geographic or spatial data.

(ii) Function :-

GIS goes beyond simple mapping and integrates various data layers to provide insights into relationships and patterns.

(iii) Dependency :-

It depends upon data and utilizes various data sources.

(iv) Output :-

Its output include maps, visualizations, and spatial analysis results.

(v) Example (Use) :-

It is used in urban planning, and environmental analysis.
