

# MOCK-7

Very good

These are perfect answers

Enough length

Enough headings

Fine diagrams

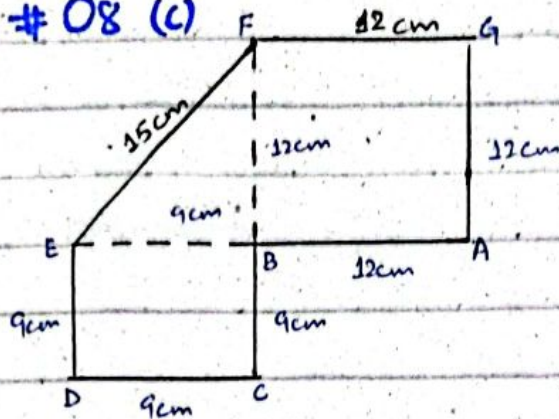
Well explained maths portion

Keep it up

## General Knowledge - I (General Science and Ability)

### SECTION - II

Question # 08 (C)



Area:

According to the question, in the given shape, there are 2 squares and 1 triangle.

We know that, in a square, all the sides are equal so in square ABFG

$$AB = GF = BF = AG = 12 \text{ cm}$$

Area of Square = Length  $\times$  Breadth

So, using the above formula to calculate the area of square ABFG:

$$\text{Area of ABFG} = 12 \times 12 = 144 \text{ cm}^2$$

Now, calculating the area of triangle, for that first we will calculate BE base



of triangle to find the area.

According to the Pythagoras Theorem

$$(Hy)^2 = (Base)^2 + (Perpendicular)^2$$

$$(EF)^2 = (BE)^2 + (BF)^2$$

$$(15)^2 = (\overline{BE})^2 + (12\text{cm})^2$$

$$225 = (\overline{BE})^2 + 144$$

$$(\overline{BE})^2 = 225 - 144$$

$$(\overline{BE})^2 = 81$$

Taking square root on both sides,

$$\sqrt{(\overline{BE})^2} = \sqrt{81}$$

$$\boxed{\overline{BE} = 9\text{cm}}$$

Now, calculating the area of a triangle using following formula:

$$\text{Area of } \triangle BEF = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= \frac{1}{2} \times 9 \times 12 = \frac{108}{2}$$

$$\text{Area of } \triangle BEF = \boxed{54\text{cm}^2}$$

In square BCDE:

$$\overline{BC} = \overline{CD} = \overline{DE} = \overline{BE} = \boxed{9\text{cm}}$$

So, the Area of Square BCDE

$$= \text{Length} \times \text{Breadth}$$

$$= 9 \times 9 = \boxed{81\text{cm}^2}$$



Now, Total area of the shape =  
 Area of  $\square$  ABFG + Area of  $\triangle$  BEF  
 + Area of  $\square$  BCDE  
 = 144 + 54 + 81

Total Area of the Shape = 279 cm<sup>2</sup>

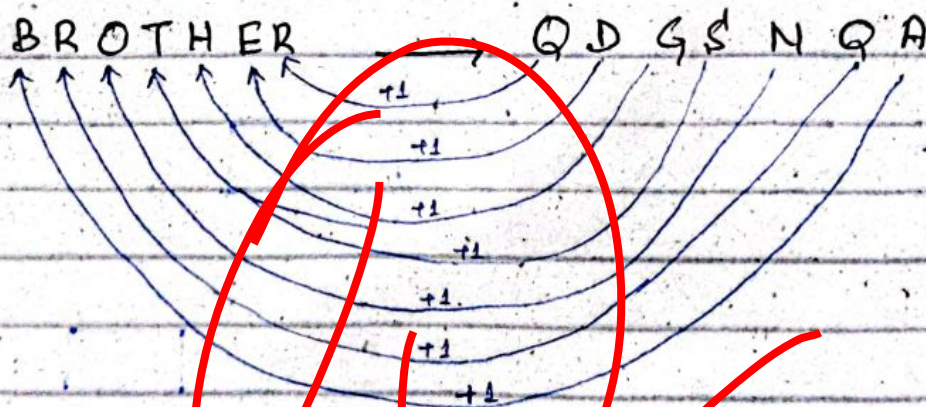
Perimeter:

To calculate the perimeter of the given shape, we need to add length of all out sides, so:

Perimeter = Sum of All Sides,  
 = AB + BC + CD + DE + EF + FG + GA  
 = 12 + 9 + 9 + 9 + 15 + 12 + 12

Perimeter = 78 cm.

Question #.8, (a)

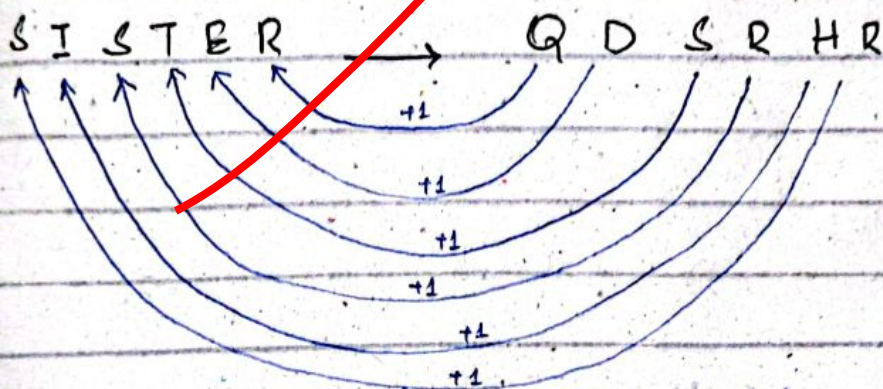


In a language, ~~that~~ a letter that comes first in the word BROTHER has to be compared with the last letter of the word of the



language QDGSNQA. Moreover, the compared letter is always a previous letter of a letter in the word BROTHER,

So for the word SISTER, the word in the language would be: QDSRHR



Question # 08 (d)

Mean:

The "Mean" is defined as the sum of the values, divided by the number of values.

$$\text{Mean} = \frac{\text{Sum of all Values}}{\text{No. of Values}}$$

$$= \frac{15 + 15 + 16 + 16 + 16 + 17 + 17 + 17 + 19}{9}$$

$$= \frac{149}{9} \Rightarrow \text{Mean} = 16.556$$



## Median:

The middle value of any arranged data set is called Median. Here, arranged data means writing all the values in ascending order.

In the provided dataset, the values are already in ascending order, i.e.,

15, 15, 16, 16, 16, 17, 17, 18, 19

So, the position of the median of the above dataset can be calculated as:

$$\text{Median} = \frac{n+1}{2}$$

$$= \frac{9+1}{2} = \boxed{5^{\text{th}}}$$

So, the value at the 5th index is 16.

Thus,

$$\boxed{\text{Median} = 16}$$

## Mode:

The mode is the most repeated value in a data set. The most repeated value in the given data set is 16. Hence,

$$\boxed{\text{Mode} = 16}$$



## Range:

The range can be defined as the "difference between the largest value and the smallest value. In the above given data, the largest value is 19 and the smallest value is 15. Hence, the range can be calculated as:

$$\text{Range} = \text{Largest Value} - \text{Smallest Value}$$

$$\text{Range} = 19 - 15$$
$$\text{Range} = 4$$

Thus, the range is: 4.

## Question # 08 (b).

Given Cards = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.

The formula of Probability is:

$$\text{Probability} = \frac{\text{No. of ways of occurrence of Event}}{\text{Total Possible Outcome}}$$

i). Probability of drawing 8.

There is only one card with number 8.

No. of ways of occurrence of Event = 1.

Total Possible Outcomes = 12.

$$\text{Probability of (8)} = \frac{1}{12}$$



ii. an even number.

Even numbers in the given data are  
2, 4, 6, 8, 10, 12.

No. of ways of occurrence of Event = 6.

$$\text{Probability of (an Even No.)} = \frac{6}{12}$$

$$\text{Probability of an (Even No.)} = \frac{1}{2}$$

iii. Probability of drawing a perfect square.

Perfect squares in the given data are  
1, 4, 9.

So, No. of ways of occurrence of Event = 3.

$$\text{Probability of (Perfect Square)} = \frac{3}{12} = \frac{1}{4}$$

iv. Probability of drawing of Negative Number.

There are no negative numbers in the given data.

So, the no. of ways of occurrence of Event = 0.

$$\text{Probability of (Negative No.)} = \frac{0}{12} = 0$$



7. Probability of drawing a no. less than 13.

All the numbers in the data set are less than 13.

So, No. of ways of occurrence of Events = 12.

$$\text{Probability of (No. less than 13)} = \frac{12}{12} = \boxed{1}$$

Question # 07 (a).

Total seats in Hall = 400.

Occupied seats in Hall = 325.

$$\text{Percentage of Capacity} = \frac{\text{Occupied Seats} \times 100}{\text{Total Seats}}$$

$$\text{Attendance at a Percent capacity} = \frac{325}{400} \times 100$$

$$\text{Attendance at a percent capacity} = 81.25\%$$

Question # 07 (b)

Given data is:

30 persons use 40 kg of sugar in = 10 days.

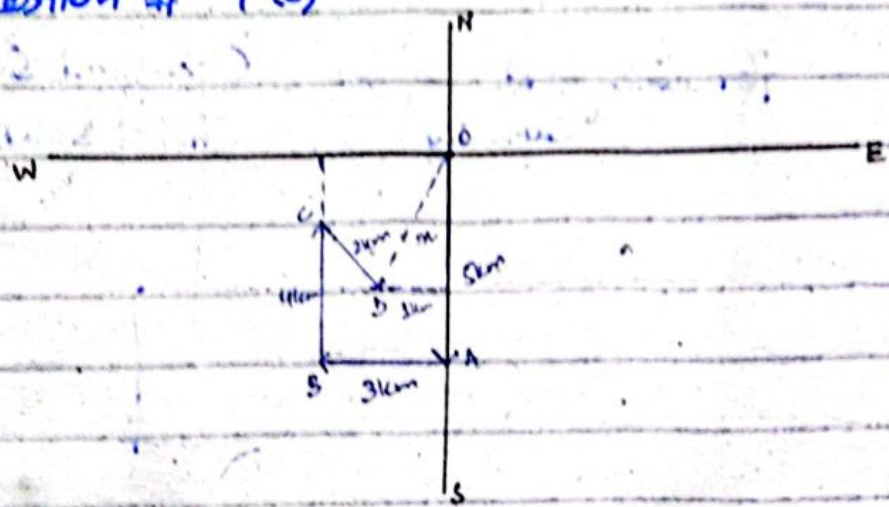
80 persons use 320 kg of sugar in = x days.



Person : Sugar (kg) : Days  
 30 ↓ : 40 ↑ : 10 ↓ ↑  
 80 ↓ : 320 ↑ : x ↑  
 $\frac{x}{10} = \frac{320}{40} \times \frac{30}{80}$   
 $x = \frac{320}{40} \times \frac{30}{80} \times 10$   
 $= \frac{96000}{3200} \Rightarrow x = 30 \text{ days}$

Thus, 80 persons will use 320 kg of sugar in 30 days.

Question # 7 (c)



- Let's denote the distances as follows
- $\vec{OA}$  : Distance travelled south = 5 km
  - $\vec{AB}$  : Distance travelled West = 3 km
  - $\vec{BC}$  : Distance travelled North = 4 km
  - $\vec{OB}$  : Distance travelled South-East = 2 km
  - $\vec{OC}$  : Distance between Initial and Final Point = x.



Now, the horizontal displacement is the difference  $\vec{OA}$  and  $\vec{BC}$  (South and North)

$$\text{Horizontal Displacement} = \vec{OA} - \vec{BC}$$

$$= 5 - 4$$

$$= \boxed{1 \text{ km}}$$

The Vertical Displacement is the sum of  $\vec{AB}$  and  $\vec{CB}$  (West and South):

$$\text{Vertical Displacement} = \vec{AB} + \vec{CB}$$

$$= 3 + 2$$

$$= \boxed{5 \text{ km}}$$

Now, we can use Pythagoras Theorem to find the crow's distance from the initial Point (O):

$$(\text{Hypotenuse})^2 = (\text{Base})^2 + (\text{Perpendicular})^2$$

$$(x)^2 = (1)^2 + (5)^2$$

$$= 1 + 25$$

$$x^2 = 26$$

Taking square root on both sides,

$$\sqrt{x^2} = \sqrt{26}$$

$$x = \sqrt{26} \text{ km}$$

Therefore, the crow travels  $\sqrt{26}$  km away from the initial point.



Question # 07 (d)

Radius of a cylinder = 10 cm.

Height of a cylinder = 36 cm.

Volume of a cylinder =  $\pi r^2 h$ .

Volume of a cylinder =  $\pi r^2 h$

$$= 3.14 \times (10)^2 \times 36$$

$$= 11,304 \text{ cm}^3$$

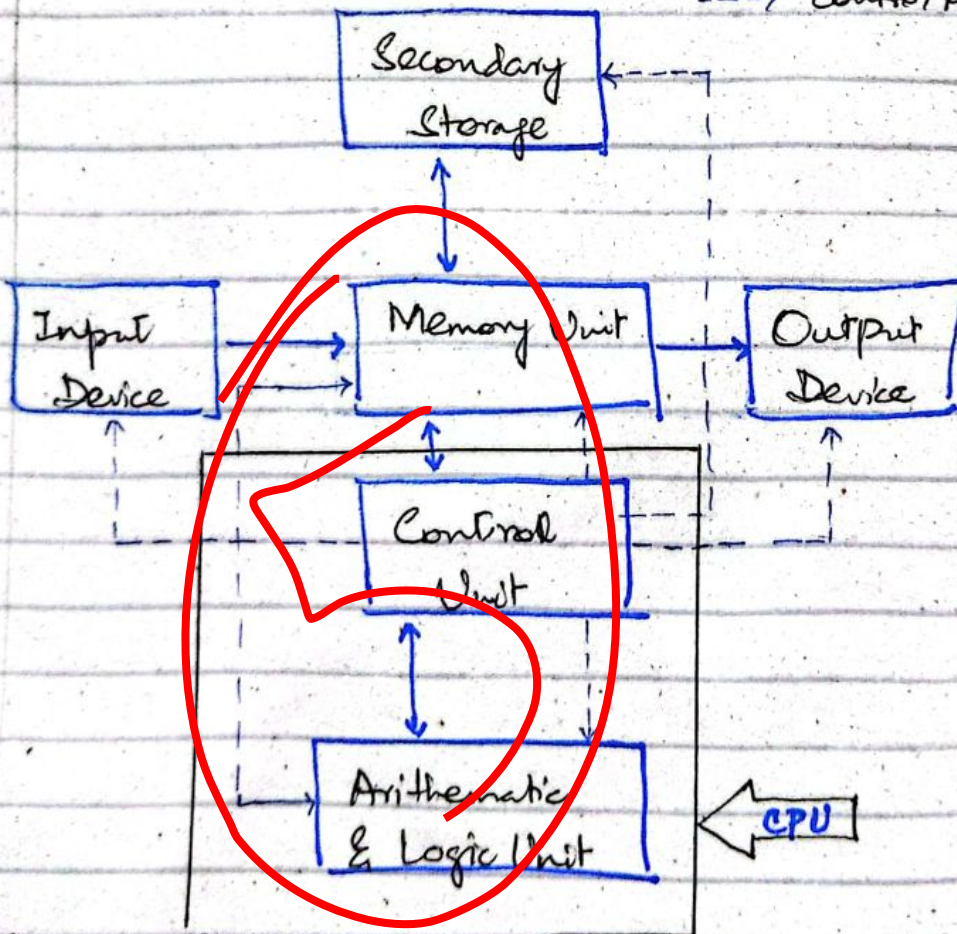
So, the volume of a cylinder = 11,304 cm<sup>3</sup>

## SECTION - I

Question # 05 (a)

→ Data Flow

---→ Control Flow



Block Diagram of Computer



## Block Diagram of I/O Devices of Computer:

A Block Diagram of a computer displays a structural representation of a computer system. The block diagram gives you a quick overview of the working process of a computer from inputting the data to retrieving the desired results.

A computer system is the combination of three components:

- 1). Input Unit.
- 2). Output Unit.
- 3). Central Processing Unit (CPU).

### 1). Input Unit:

The input unit consists of input devices such as mouse, keyboard, scanner, etc. These devices are used to input information or instruction into the computer system.

#### \*1. Functions of Input Unit:

- i). The input unit converts the inputted data or instructions into binary form for further processing.
- ii). Input unit transmits the data to the main memory of computer.



## 2) Output Unit

The output unit consists of devices that are used to display the results or output of processing. The output data is first stored in the memory and then displayed in human readable form through output devices. Some of the widely used output devices are Monitor, Printer, and Projector.

### \*1. Functions of Output Unit:

- i). The output unit accepts the data or information in binary form from the main memory of the computer system.
- ii). The output unit converts the binary data into a human readable form for the better understanding.

## 3). Central Processing Unit (CPU)

CPU or Central Processing Unit is known as "Brain of the Computer". It is electronic hardware device that processes all the operations (eg. arithmetic and logical operations) of the computer. In other words, all the major calculations, operations or



comparisons are performed inside the CPU. It is also responsible for handling the operations of several other units.

It is based on three units.

- i). Control Unit.
- ii). Arithmetic and Logic Unit
- iii). Memory Unit.

#### i). Control Unit

The control unit of a CPU controls all the activities and operations of the computer. It is also responsible for controlling input/output, memory, and other devices connected to the CPU.

#### ii). Arithmetic and Logic Unit (ALU)

The data inputted through input devices is stored in the primary storage unit. The ALU performs arithmetic and logic operations. The ALU controls simple operations such as: addition, subtraction, division, and multiplication.

#### iii). Memory Unit:

Memory Unit is an essential part of the system which is used to



store data and instructions before and after processing. The memory unit transmits the information to other units of the computer system when required.

There are two types of memory unit.

- a). Primary Memory
- b). Secondary Memory

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Question # 5 (b)

### \*1. Optics or Fiber Optics

The fiber optics or optics is a bundle of thin strands made of glass or plastic, which uses light (photon particles) to transmit signals. Therefore, the transmission capacity of fiber optic is far greater than other mode of communication, such as copper wire and metallic wire. As a result, it is used in the forms of different cables and is being utilized in numerous fields of life.

### \*1. How does Fiber Optics works?

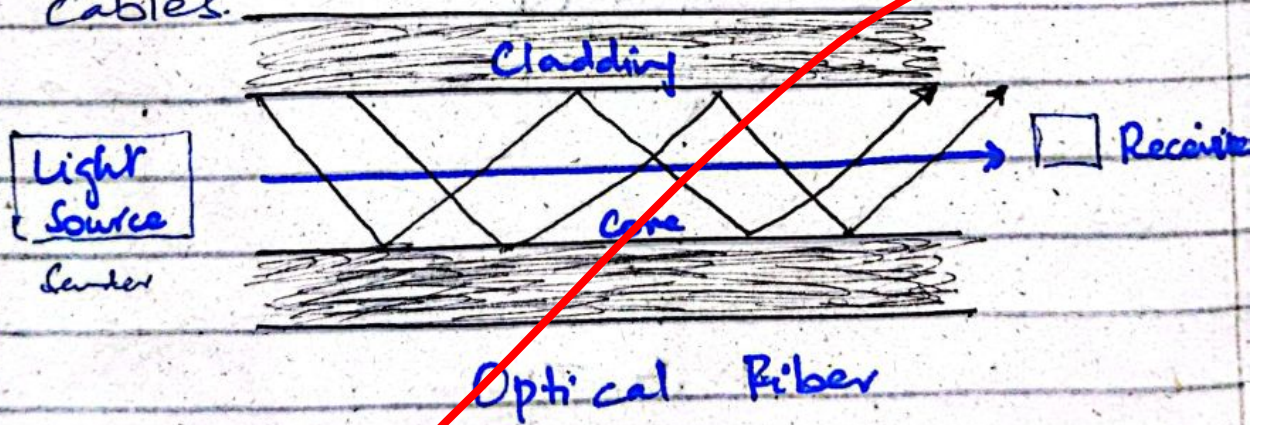
The propagation of light in an optical fiber requires that light



should be totally confined within the fiber and not escape from it. This can be done by:

- 1). Total Internal Reflection
- 2). Continuous Refraction.

Since, light rays travel in straight lines, optical cables are designed in a way that they bend all the light rays inwards. Light rays travel continuously bouncing off the optical fiber walls and transmitting end-to-end data. Although light signals do degrade over progressive distances, depending on the purity of the material used, the loss is much less compared to using metal cables.





Question # 05 (d)

\*1. Difference between GPS and GIS

GPS	GIS
<b>Stands for</b>	
GPS stands for Global Positioning Systems	GIS stands for Geographic Information Systems.
<b>Definition</b>	
GPS is a satellite-based navigation system that uses satellites that orbit the Earth to send information to GPS receivers that are on the ground.	GIS is a computer based system used for capturing, storing, analyzing and visualizing geospatial data.
<b>Purpose</b>	
GPS is primarily focused on location and navigation.	GIS is focused on spatial analysis, mapping, and decision making.
<b>Data Type</b>	
GPS deals with coordinates (latitude, longitude) and sometimes additional information like velocity and time.	GIS deals with spatial data, which includes both geographic coordinates and associated attributes.



GPS	Functionality	GIS
GPS provides real-time location information		GIS integrates, analyzes, and visualizes spatial data to derive insights and make informed decisions.

Question # 05 (c)

### \*1. Solid Waste Management:

Solid Waste Management (SWM) involves collection, treatment, disposal, and recycling of solid waste to minimize its impact on human health and the environment.

### \*2. Methods of Solid Waste Management

#### 1). Open Dumping

This is the simplest and oldest method where waste is disposed of in open areas without any treatment or cover.

#### 2). Landfills

Waste is buried in designated land areas, often lined to prevent leachate from contaminating soil and water.



### 3). Incineration

Waste is burned at high temperatures to reduce volume and generate energy.

### 4). Recycling

Collecting and processing waste materials to create new products.

### 5). Composting:

Decomposition of organic waste into nutrient-rich compost.

### 6). Biological Treatment

Uses microorganisms to break down and treat waste.

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## Question # 04 (a)

### \*1 Pesticides

Pesticides are chemicals or substances used to control, repel, or kill pests. Pest can include insects, weeds, fungi, rodents, and other organisms that negatively impact on crops, livestock, or the environment. Pesticides are widely used in agriculture, public health,



and households to manage pests and protect human health.

### \*1. Herbicides:

Herbicides are specific type of pesticides designed to control or eliminate unwanted plants, commonly known as weeds. They are used in agriculture, landscaping, and forestry to manage vegetation and prevent the competition of unwanted plants with crops or desirable vegetation.

### \*1. Insecticides:

Insecticides are pesticides specifically formulated to control or eliminate insects. They are used in agriculture, public health, and households to protect crops, livestock and human from the negative effects of insect infestations. Insecticides can target various life stages of insects including eggs, larvae, and adults.

### \*1. Ceramics:

Ceramics refer to a broad category of inorganic, non-metallic



materials that are typically made by shaping and firing clay or other minerals at high temperatures.

The term encompasses a wide range of products including pottery, tiles, bricks, etc. Ceramics exhibit properties like hardness, heat resistance, and electrical insulation.

## \*1. Green House Effect

The greenhouse effect is a natural process that warms the Earth's surface. It occurs when the sun's energy penetrates Earth's atmosphere and is absorbed by the surface. The Earth then emits some of this energy in the form of infrared radiations. Greenhouse gases such as carbon dioxide, Methane, and trap a portion of this outgoing radiations, preventing it from escaping into space. This trapped heat warms the atmosphere and the Earth's surface, contributing to the planet's overall temperature.

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Question # 084 (c)

1). RADAR

Radio Waves (specifically microwaves) are used in RADAR.

2). SONAR

Sound waves are used in SONAR.

3). LIDAR

Laser (Light) waves are used in LIDAR.

4). Mobile Phone

Radio waves (specifically microwaves) are used in Mobile Phone.

5). Thermistor:

Thermistors do not use any types of waves.

Question # 084 (b)

\*1. Bonding in Water Molecule:

The bonding in a water molecule ( $H_2O$ ) is primarily covalent, with a distinctive polar nature. Following are the bonding overview:



## 1). Covalent Bonds:

### i). Description:

Covalent bonds involve the sharing of electrons between atoms.

### ii). Water Molecule Structure:

In a water molecule, two hydrogen atoms (H) are covalently bonded to one oxygen atom (O).

### iii). Electron Sharing:

Each hydrogen atom shares one electron with the oxygen atom, forming two single covalent bonds.

## 2). Polarity:

### i). Description:

Oxygen is more electronegative than hydrogen, meaning it has a greater tendency to attract electrons.

### ii). Dipole Moment:

The charge separation imparts a dipole moment to the water molecule, making it polar.

## 3). Hydrogen Bonding:

### i). Description:

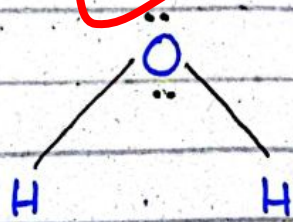
The polarity of water molecules allow for hydrogen bonding interactions.



(ii). Interactions: The partially positive hydrogen atom of one water molecule are attracted to the partially negative oxygen atoms of neighboring water molecules.

(iii). Effect:

Hydrogen bonding leads to unique properties of water, such as high cohesion, surface tension, and a relatively high boiling point.



Covalent Bonding.

Question # 04 (d)

\*1/ Advantages of AI

- 1) AI reduces human error
- 2) AI allows for quicker decision making.
- 3) AI reduces the risk.
- 4) AI automates repetition
- 5) AI assists with digital tasks.

\*1/ Disadvantages of AI

- 1) AI necessitates higher overall costs.



- 2). AI causes job loss.
  - 3). AI lacks the ability to be creative.
  - 4).  $\therefore$  Emotional range is not there in AI.
  - 5). Inability to integrate Ethical principles.
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