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Mock = 5

General Science and Ability

Part - II

Section - A

Q.No.2

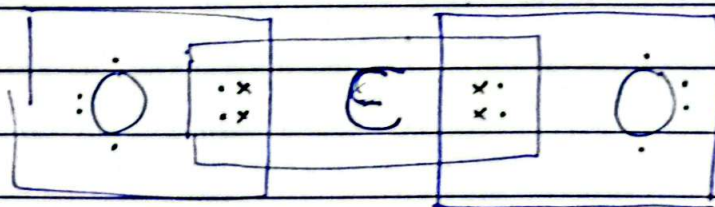
a. Answer. Octet Rule in Chemical in chemical Bonding :

Octet Rule : This rule states that an atom must complete Eight electron in its outermost shell in order to attain a complete stability. It is also called as octet rule by Lewis.

For example : CO_2 (Carbon dioxide).

Here each carbon element shared its $4e^-$ with two elements of oxygen.

Diagrammatically,



Each, element in above diagram have make themselves stable by completing Eight Electron in its their outermost shell. Hence, it is called as Octet rule in chemical in chemical Bonding. The dot (·) and cross (x) represents electron of different element.

Covalent Bond : "The type of chemical bond in which the element share electron mutually is called as Covalent Bond."

In this type of bond, the atoms share pair of electron mutually.

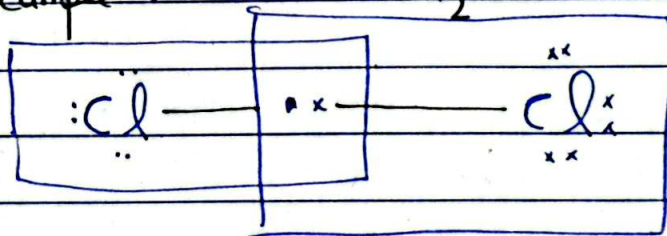
Types of Covalent Bond :

There are three types of Covalent Bond.

(1) **Single Covalent Bond :** (—)

The type of covalent bond in which each element share only one electron with other element is called as Single covalent bond. It is represented by single dash. (—).

For example :



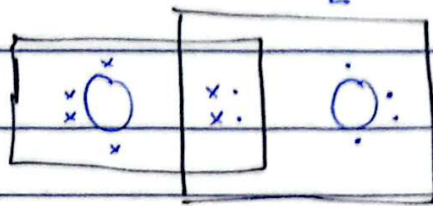
Here, each chlorine share one outer electron with other chlorine and thus get stability by octet rule.

(2) **Double Covalent Bond :** (=)

The type of covalent bond in which each element share two electron with other element is called as Double Covalent Bond. It is denoted

by double dash. (\equiv)

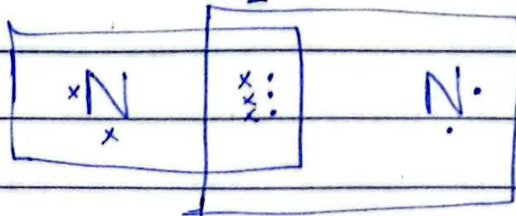
Example: $O_2 \Rightarrow O=O$



In above diagram, it can be seen that each oxygen element have completed Eight electron in their outermost shell by sharing two electrons with other oxygen element.

(3) Triple Covalent Bond : (\equiv) The type of covalent bond in which each element share three electrons mutually is called as Triple Covalent Bond. It is represented by three dash lines (\equiv) as each element make three pairs of electron mutual sharing with other element.

Example: $N_2 \Rightarrow N \equiv N$



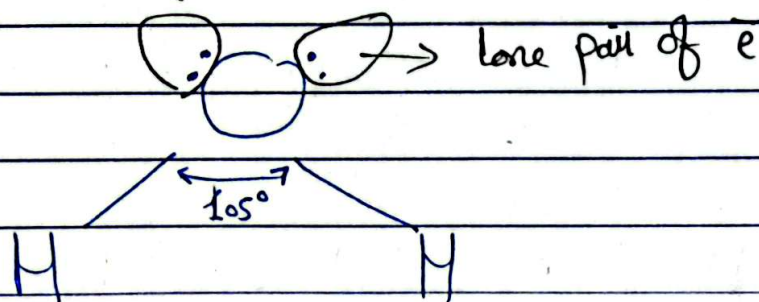
Each Nitrogen element shared three electrons and thus gets stability by triple Covalent Bond.

Q. No. 2. b.

Answer: Why Water Molecule is Angular in Structure?

Water molecule is angular in structure due to strong repulsion of between lone pair and lone pair electron of oxygen atom. Water (H_2O) is actually example Single covalent Bond.

Diagrammatically,



Explanation:

Here, oxygen has shared $1e$ each with Hydrogen atoms and have formed Double Single Covalent Bond.

According to VSEPR (Valence Shell Electron Pair Repulsion) Theory, which states that lone pair - lone pair electron pair repulsion is greater than Bond between bond-pair and bond-pair.

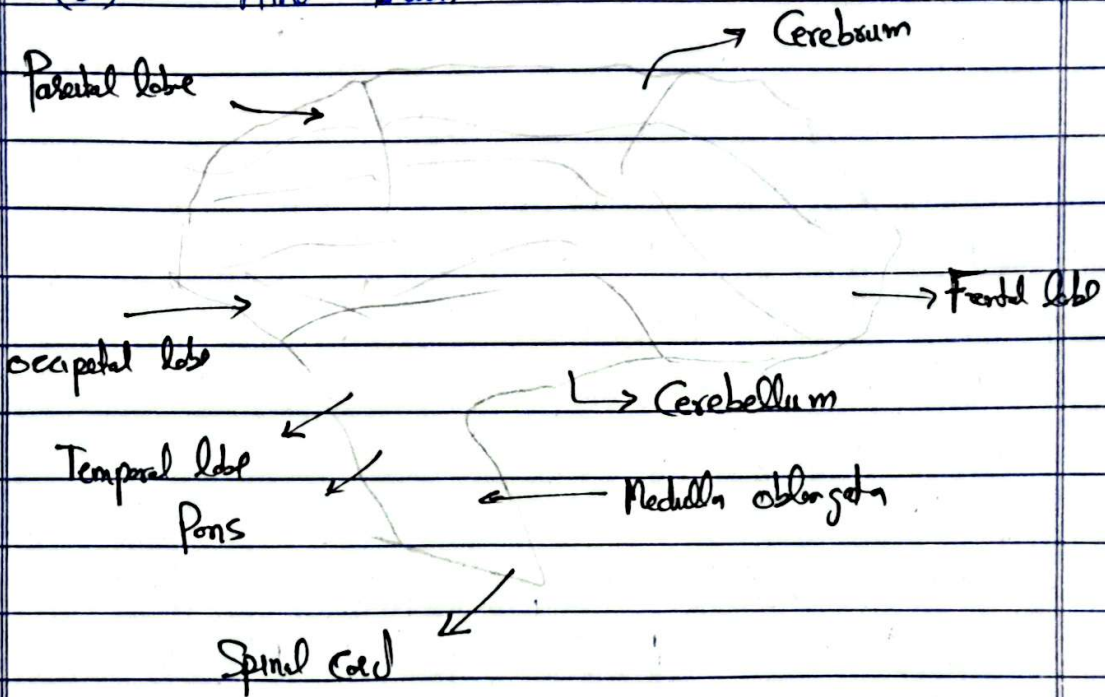
So, the water molecule adopts a bent structure, that is why water molecule is angular in structure.

Q.No.2 C.

Answer: Structure of Human

Brain: Human Brain is composed of mainly three parts:

- (1) Fore Brain
- (2) Mid Brain
- (3) Hind Brain



Fore Brain is composed of Cerebrum, Thalamus, and Hypothalamus.

Mid Brain consists of tectum and tegmentum.

Hind Brain is made of Cerebellum, pons and medulla oblongata.

Functions of Human Brain:

The brain is a complex organ that performs several functions such as

- (1) Controls thought - Cerebrum

(2) Memory — Cerebrum plays an important role

(3) Emotion control

(4) Reaction to a stimuli (Reflex Action) : The brain is a sensory organ, and it reacts to any external reaction within fraction of a second. Neuron played an important role in this regard.

Neuron : It is a structural and functional unit of central Nervous System. It has three main types

(a) Sensory Neuron

(b) Associative "

(c) Motor Neuron

(5) Regulates the functions of the body : Through Neuron the Brain controls different functions of human body

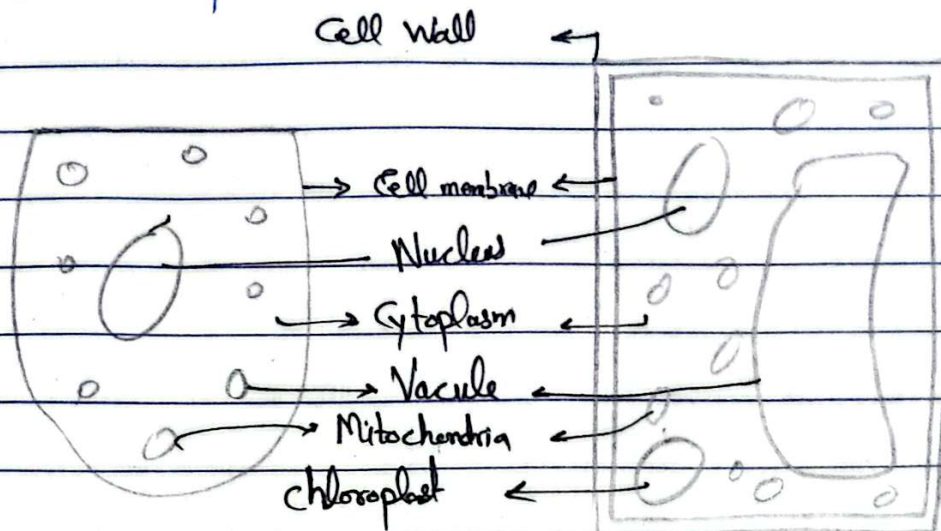
(6) Vision, breathing, temperature and hunger sensation.

In short, Human Brain performs complex functions related to the controlling, maintaining, and regulating different human body. Ultimately, it is the human body which maintains the human body in regular function and order.

Q.No.2 d.

Answer: Cell Structure :

Mainly there are two types of cells that is plant cell and Animal Cell



↓
Animal Cell

↓
Plant Cell

Cell Wall : Absent	Present
Vacuoles : Many and Small	Large single central vacuole
Nucleus : At centre	Reside in the cell
Cytoplasm : Denser	Lighter
Centrioles : Present	Absent
Glycogen : Reserve food in animal cells	Starch : Reserve food in plant cell
Cilia : Present	rarely present
Ribosomes : Absent	Present

The structure of cell is composed of various organelles called cell organelles. Some of them are
 (1) Nucleus (2) Endoplasmic Reticulum

(3) Ribosomes

(4) Mitochondria

(5) Golgi bodies

(6) Lysosomes

(7) Vacuole

(8) Chloroplasts

(9) Centrioles

(10) Plastid

(11) Cell wall

(12) Cell membrane

Three Sub-cellular Organelles and their functions:

(1) Mitochondria: It is also called as Power house of the cell. Its function include photosynthesis, energy production, supplying digestive enzymes, storage of energy, Basic unit of ATP (energy unit) is produced here through Krebs cycle.

(2) Golgi Bodies: It helps in cell secretion, transportation of wastes, glycolipid production. It forms sacs and secretes and transport waste from the cells. Golgi was given the name because of the scientist Golgi.

(3) Vacuole: Its function include storage of food particle and waste. Also, transportation of wastes occur through it. It also gives shape to the cell.

(4) Ribosomes: It helps in protein synthesis of the cell.

Q. No. 5. a

a. Answer:

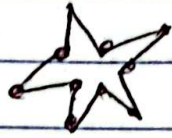
Networking: It is a way through which devices communicate with each other in a network form. Through this data can be exchanged efficiently.

Some of its type are

(1) Bus Networking



(2) Star Networking



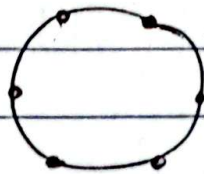
(3) Mesh Networking



(4) Line Networking



(5) Circular Networking



Internet Standards: Set of guidelines, protocols and conventions that define how devices should communicate and exchange data over a network.

Some important Internet standards are

(1) HTTP - HyperText Transfer Protocol
Web browser

(2) Secure Sockets Layer (SSL)

(3) TCP (Transmission Control Protocol)

(4) User Datagram Protocol (UDP)

(5) Domain Name System (DNS)
IP address

Benefits of Networking and
Internet standards :

Are as follows

(1) Efficiency : Data transfer

(2) Security : Difficult to hack

(3) Scalability : Expanded to more
devices

(4) Innovation : Provide common
baseline for developers -

Conclusion: Both have made internet
a reliable platform for communication
and collaboration.

Q. No. 5

b. Answer:

Artificial Intelligence : It is simulation of human intelligence in machines, enabling them to act like human. Such as problem-solving, learning, reasoning, decision making and so on.

! AI system used algorithms, process information, learn from it, and make predictions

It has two main types

(1) **Weak AI** - For specific tasks with constraints

(2) **Strong AI** - Possess Human like intelligence

Pros of AI : Are following

(1) **Automation** : Costs saving and resource optimization.

(2) **Improved decision making** : Computer decision making

(3) **Medical Advancement** : Like Surgery and Medicine making

(4) **Safety and Security** : Facial Recognition, anomaly detection

(5) Environmental pollution reduction
Resource management

Cons of AI : Are as follows

(1) Job Displacement : loss of traditional industrial jobs

(2) Bias and Fairness : Partiality

(3) Privacy concerns : Personal data hacking

(4) Ethical Dilemma : Related to to Religion of certain community

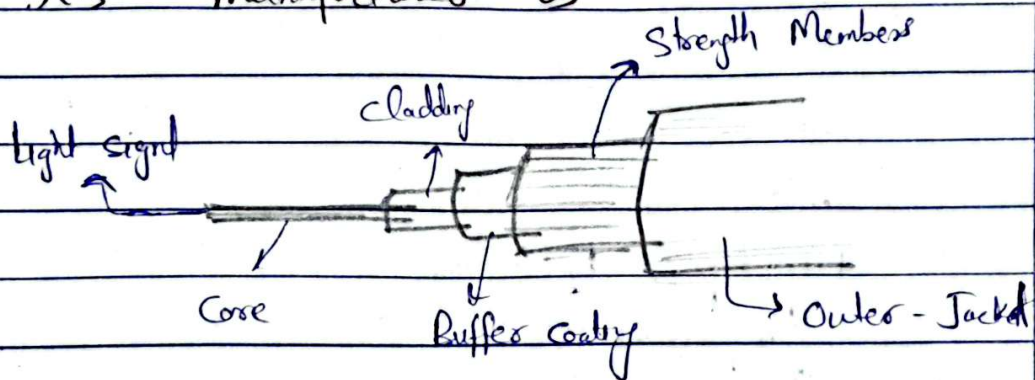
(5) Over-dependency : Eroding human skills, and expertise.

Conclusion : AI has both pros and cons, however, it depends upon Human being that for what intention he is exploring this technology

Q. No. 5 C.

Answer: How Optical Fibre is constructed? Optical Fibre are high quality glass that transmit light signal over long distances.

It is manufactured as



" Optical Fibre "

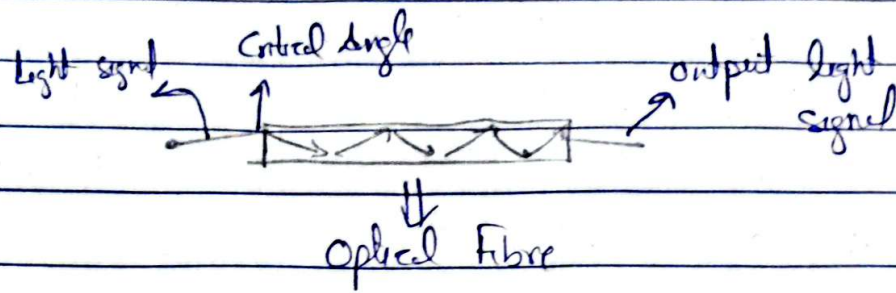
Various parts are

- (1) Core
- (2) Cladding
- (3) Buffer coating
- (4) Strength fibre
- (5) Outer Jacket

The size of single optical fibre is less than hair width and it transmit light signal through it.

How Optical Fibre transmitting Electromagnetic Radiations: ?

Optical Fibre transmit light signal through a principle called as Total Internal Reflection of light.



Some steps of transmission include

- (1) Light source
- (2) Critical angle
- (3) Internal reflection
- (4) Multiple Reflection
- (5) Propagation = $c = 3 \times 10^8 \text{ m/s}$
- (6) δ Low loss
- (7) Information Encoding
- (8) Detection
- (9) Output signal.

Conclusion: Optical fibre are efficient in transmitting signal through large distances. And now a days it is largely used in internet and other technology for data transmission and network communication.

Q. No. 5. d.

Answer: Bioavailability of Nutrients : Refers to the rate at which nutrients from the food we consume, absorbed and utilized. It determines the nutritional value of a diet.

Factors influencing Nutrient Bioavailability :

- (1) Nutrient Form : Different nutrient have different value and form.
- (2) Cooking and Processing - Can increase Bioavailability of Nutrient
- (3) Age : Different requirement

Examples of Nutrient Bioavailability

- (1) Fe : Higher Bioavailability
- (2) Ca
- (3) Vitamins

Importance of Nutrient Bioavailability

- (1) Nutritional Adequacy

(2) Dietary Planning

(3) Food choice

(4) Supplementation

Conclusion: It determines
how effectively the body
can use ~~nut~~ nutrients from the
foods we eat.

Section - B

Q. No. 7.

a. Answer:

$$\text{Ashaq work rate} = \frac{1}{6} \text{ jobs per hour}$$

$$\text{Abbas " " } = \frac{1}{4} \text{ " " "}$$

$$\text{Jofan " " } = \frac{1}{8} \text{ " " "}$$

First 2 hours,

$$\text{Ashaq} = \frac{1}{6} \times 2 = \frac{1}{3} \text{ of Job}$$

$$\text{Abbas} = \frac{1}{4} \times 2 = \frac{1}{2} \text{ " "}$$

$$\text{Hence, together} = \frac{1}{3} + \frac{1}{2} = \frac{5}{6} \text{ of Job}$$

$$\text{Jofan Time} = \frac{1}{6} \times \frac{8}{2} = \frac{4}{6} \text{ hours}$$

$$\text{Jofan time} = \frac{2}{3} \text{ Hours}$$

$$\text{Total time} = 2 \text{ Hours} + \frac{2}{3} \text{ Hours}$$

$$\text{Total Time} = 2 \text{ Hours and 40 minutes.}$$

Q. No. 7. b.

Answer:

$$\text{Area of farm} = 576 \text{ m}^2$$

$$\sqrt{576} = 24 \text{ m}$$

$$\text{Shoxtel wall area} = 24 \times 2 = 48 \text{ m}^2$$

$$\begin{aligned} \text{longer wall area} &= 24 \times 3 \\ &= 72 \text{ m}^2. \end{aligned}$$

Now,

Sum up Four walls area

$$\text{Total wall area} = 48 + 48 + 72 + 72$$

$$= 240 \text{ m}^2$$

Hence, total area of walls
is 240 m^2 Answer.

Q. No. 7. C

Answer:

1. Mean (Average) :

$$M = \frac{18 + 18 + 19 + 19 + 19 + 21 + 21}{7}$$

$$M = 19.29 \text{ years}$$

2. Median : is 19 years

3. Mode : 19 and
then 21 years

4. Range : $R = 21 - 18$
 $R = 3 \text{ years}$

Q. No. 7 - d.

Answer: Difference between mental ability skill from IQ test:

Mental ability skills are

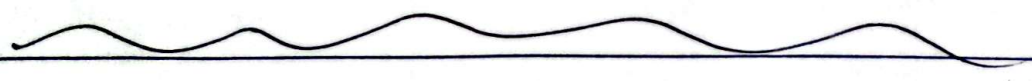
- (1) Broad Range
- (2) Everyday functioning
- (3) Not measured by a single test
- (4) Developmental and Improvable

IQ tests [Intelligent Quotient Tests]

- (1) Specific Assessment
- (2) Standardized testing
- (3) Single Measure
- (4) Stable over time

Difference : Both have different characteristics such as mental ability skills are Broad Range and developmental while IQ tests are specific and standardized

The two concepts have different scope, application and way of measurement.



Q. No. 8

a. Answer:

$$V_1 = 40 \frac{\text{km}}{\text{hr}}$$

$$V_2 = 60 \frac{\text{km}}{\text{hr}}$$

$$\text{Average} = \frac{V_1 + V_2}{2} = \frac{40 + 60}{2}$$

$$\text{Average Speed} = \boxed{50 \frac{\text{km}}{\text{hr}}} \text{ Answer}$$

Q. No. 8

b. Answer:

ROSE
6821

CHAIR
73456

PREACH
961473

} Given Code

Hence, SEARCH
214673

So, SEARCH = 214673
Answer

Q. No. 8 C.

Answer. Given that

A is brother of B

B is sister of C

C is father " D

D is a male member

Required - How D is related to A.

A

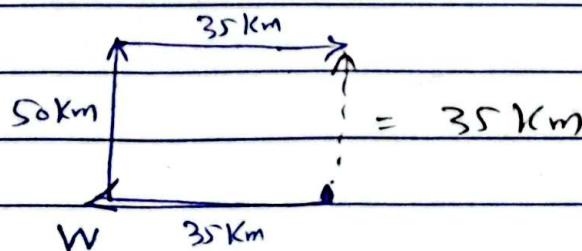
Solution: As D is a male member and is the son of C which is the sister of B, so, A is the uncle of D.

OR

D is the Nephew of A.

Q. No. 8 . D

Answer:



By, Vector diagram the resultant distance between the starting and end point is 35 km

Answer

