PART - II
(SECTION-A)

General Instructions

1. Give numbering to headings
2. Do not write lengthy paragraphs. Write medium sized paragraphs with headings.
3. Do not use table for comparison and contrast questions.
4. Draw figures/diagram/flowchart where needed.
5. Start new question from fresh page.
6. Write unit of the answer in ability section.
7. Explain mathematical steps and the reasoning for better score.
8. Change colour scheme for references to give them more visibility.
9. Manage time well.
10. Wide page borders are discouraged. Should be reasonable.
11. Avoid writing wrong references.
12. Give more weightage to expressedly asked part/s of the question.

37.5

Q. No 2

Octet rule:

Octet rule or law of octaves is an important rule as for as chemical bonding is concerned. This Law states that every atom needs eight electrons in its outermost shell except the atoms of hydrogen and Helium, which follow duplet rule. For completing octet rule carbon requires further four electrons. After completion of octet rule an atom acquires stability and usually do not participate in other bond formations.

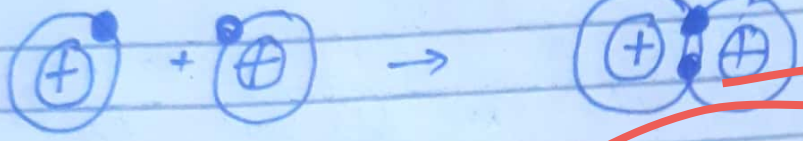
Covalent bonding:

Type of chemical bonding which is formed by mutual sharing of electrons between two atoms. It always occurs between two non metal atoms as they both want to acquire stability by gaining electrons. Hence, neither of them wants to

lose its electrons. In this case they both come closer to each other and mutually share their electrons by forming a covalent bond.

e.g.

$H + H \longrightarrow H_2$



other examples:

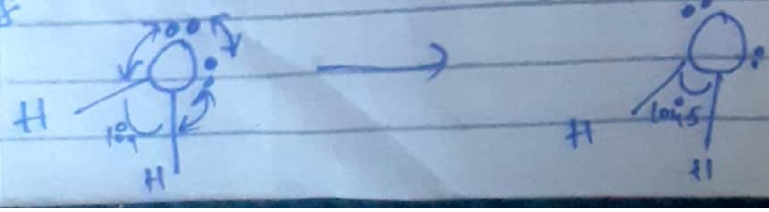
H_2O, N_2, Cl_2, NH_3, etc.

Angular (V) structure of water:

Water molecule posses an angular or bent structure owing to presence of its lone pair of electrons. According to Valence Shell Electron pair Repulsion (VSEPR) Theory, there exists a force of repulsion between electrons. Bonded electrons have less repulsion as compared to lone pairs electrons. Hence, molecules having lone pair electrons show bent in their structures due to high repulsive forces.

This lone pair to lone pair repulsion changes the bond angle of water from 109.5° to 104.5°

e.g.



(C)

Structure of Brain:

Brain is the most delicate but important part of human body. It is enclosed in a bone case called Cranium. Brain is normally divided into three parts.

(A) Fore brain: This is the largest part of human which additionally consists of three important parts

(1) Cerebrum (Largest)
(2) Thallamus
(3) Hypothallamus (smallest)

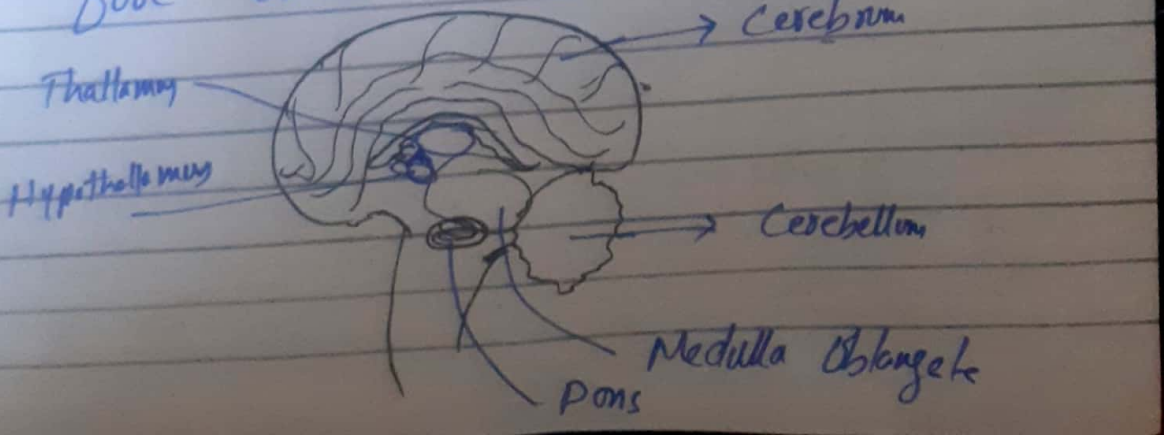
(B) Hind Brain:

It is second largest part of Human brain and is located on backside of human head. It consists of following main parts

(1) Cerebellum → (Largest)
(2) Medulla Oblangata
(3) pons → (smallest)

(C) Mid brain:

This is the middle part of the brain which connects the fore brain and Hind brain



Function of brain:

Brain is the important part of human nervous system and helps in communications and coordination of all organ systems. Each part of the brain has its specific function. following are the main functions played by its various parts.

(1) Hypothallamus
It controls body temperature at a fixed point. i.e. 37.C°/98.6F° It also helps in osmoregulation

(2) Cerebrum:
All the functions speech, and decision making are performed by cerebrum

(3) Cerebellum:
It controls the vision process and also helps the body to maintain its balance

(4) Medulla Oblangata:
It helps in movement of Muscles and swallowing of food.

(5) Pons:
It controls the thirst

(D)

Structure of cell:

Cell is the structural and functional unit of all living Things. All the

Cell diagram?

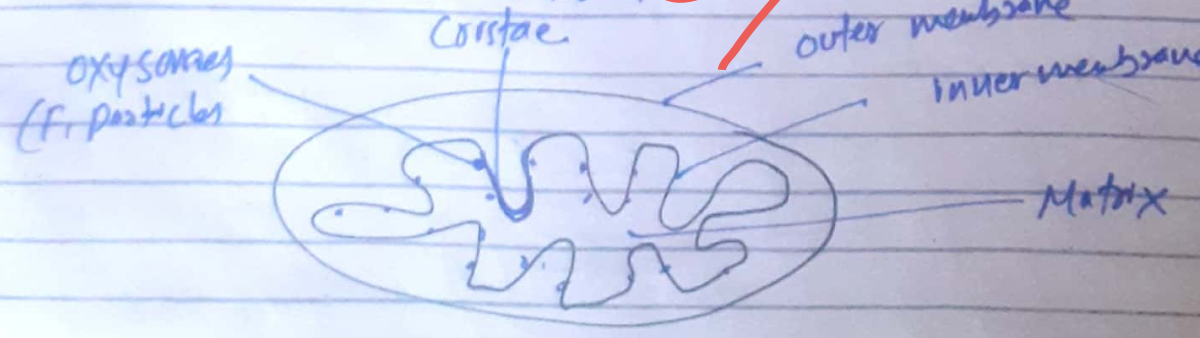
plants and animals possess their own cells. There is slightly difference in plants and animals cells.

All cells a have a semipermeable membrane called cell membrane or plasma membrane. Which contains a semi-viscous fluid called cytoplasm. Cell organelles are present inside the cytoplasm. Nucleus is present inside the cytoplasm, usually at centre in animal cells. In plants its place is taken by a large vacuole. Apart from this cells contain various sub-organelles such as Mitochondria, Golgi bodies, Chloroplasts, Centrioles, ribosomes, and Endoplasmic reticulum, etc.

Functions of three sub organelles

① Mitochondria:

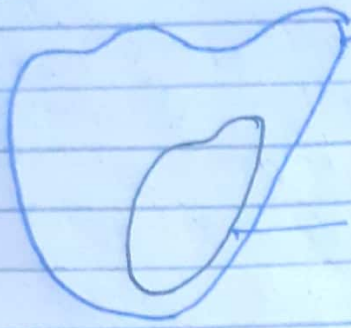
Mitochondria is known as the power house of the cell. It produces energy for the cell. Energy is produced in the form of ATP (Adenosine Triphosphate) which then helps the cell in various chemical reactions.



(Mitochondria)

② Ribasomes:

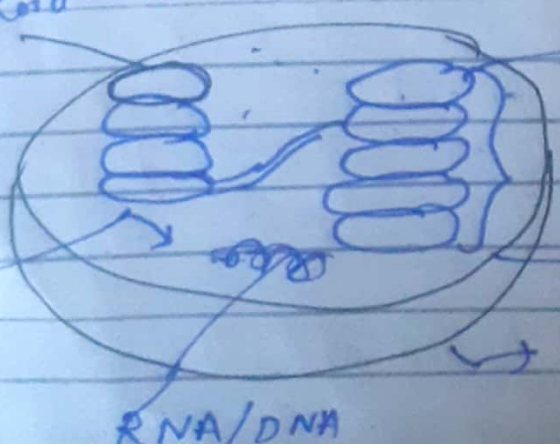
Ribosomes are known as protein factories, because they help in synthesis of protein. Ribasomes, with the help of messenger RNA and transfer RNA synthesizes protein.



(Structure of Ribosome)

③ Chloroplasts:

Chloroplasts are only present in plant cells where they help in preparation of food. Chloroplasts contain chlorophill. With the help of chlorophyll and presence of sun light, plants produce their own food that is glucose. Glucose is then converted into all other forms: vitamins, carbohydrates, proteins, and lipids, etc



Q.NO.3

Polio: Polio is a disease caused by a virus called poliomyletes. It causes disorder in nervous system and results in paralysis of legs. Sometimes it also leads to death.

Causes:

The main cause of polio is the presence of poliomyletes virus.

Symptoms:

pain in backbone, joints, etc malfunctioning of nervous system are the early systems. While last stage is the complete paralysis of legs or arms.

Difference between IPV and OPV

There are two type of vaccines available for the treatment of polio. These are IPV and OPV.
IPV is the vaccine which is injected into the body. It is available in the form of injections.
While OPV is oral-based polio vaccine which is taken orally by children upto age 5.

(b)

parts of Nervous System.

Two important parts of Nervous system are

(1) central Nervous system (CNS)
(2) peripheral Nervous system (PNS)

CNS:

CNS or Central Nervous System is the vital part of nervous System which is located centrally. It consists of two main parts: The brain and spinal cord. Both Brain and spinal cord help in Communication system. These contain smaller specialized cells called neurons which help in carrying impulses.

There are three type of neurons

(A) Inter neurons: These are present inside CNS and link the other two Neurons

(B) Sensory neuron: Sensory Neuron receive impulses and carry them to CNS.

(C) Motor Neuron: These are present in effectors and respond after an action or impulse received by inter neurons.

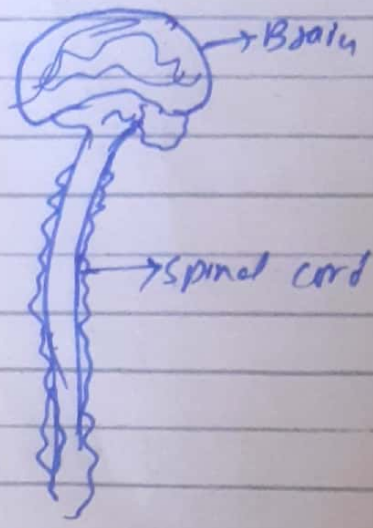
Nervous system

CNS

PNS

Brain

Spinal cord



Alzheimer Disease:

Alzheimer's Disease is a disorder of Central nervous system. In which patient loses its memory gradually. Within a year or two the patient loses its all memory. He becomes unable to recall any thing. This disease was firstly discovered by a scientist 'Alzheimer'. Due to his name it is now referred as Alzheimer's disease.

((C))

Carbohydrates:

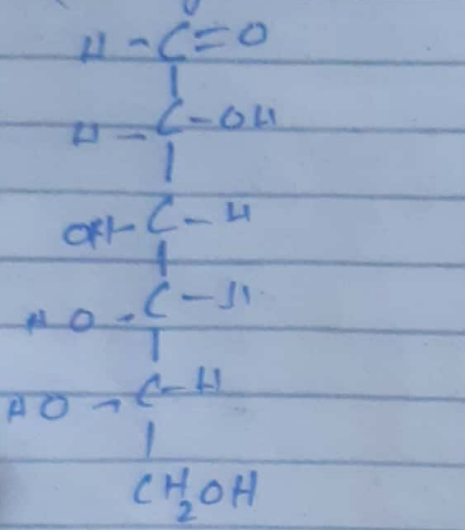
These are the organic Capounds Containing Carbon, Hydrogen and Oxygen. Generally Hydrogen to Oxygen ratio is also to that of water (2:1).

Structure:

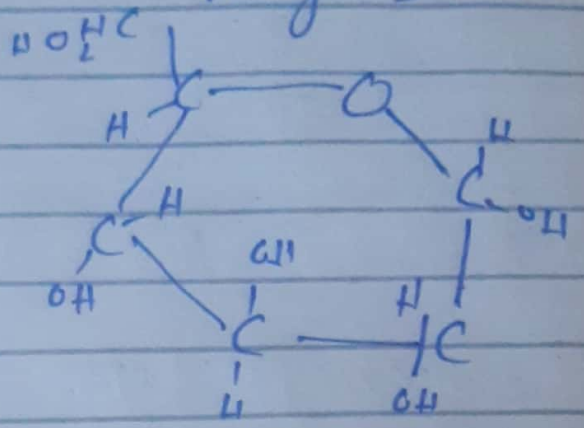
Carbohydrates exist in various forms and structures. They have straight Chains, ring structure and poly mer structure

e.g.

Glucose (straight chain)



Ring structure



Classification

Carbohydrates are classified into three main categories.

Monosaccharides:

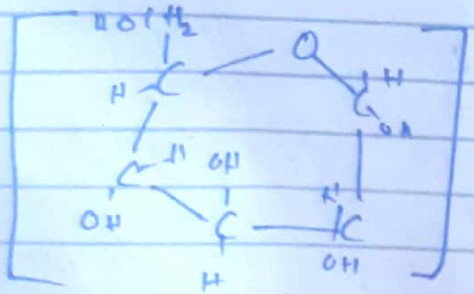
These are the simples units having one unit with carbon atoms ranging from three — Nine. They are easily soluble in water and give sweet taste eg glucose, Fructose, etc.

Oligosaccharides They contain more than two subunits generally 2- 10 units They are partly soluble and less sweet in taste.

eg Glucose + Glucose → Maltose
Glucose + Galactose → Lactose
Glucose + Fructose → Sucrose
Glucose + Glucose + Glucose → Raffinose

c) Polysachharides

These are the polymers of carbohydrates. They contain more than ten subunits of sugar molecule. They are, usually, insoluble and tasteless.
eg starch, glycogen etc.



(starch molecule)

Function of carbohydrates:

Following are the main functions of Carbohydrates.

① They helps in energy production
② They help in cell membrane formation
③ They act as cofactors for enzymes
④ They are also present in some hormones
⑤ They are good source of food for animals
⑥ They are used for making clothes
⑦ They provide shelter as woods are made up of carbohydrates
⑧ They are also used as fuels
⑨ They are used as furniture
⑩ They protect the foods, especially fruits, from damage.

(D)

Importance of preservatives and antioxidants:

Both preservatives and anti-oxidants have a vital role in preservation of food.

1. They help preserve the food for longer period of time.
2. They retard the process of food spoilage
3. Anti-oxidants stop the process of oxidation which makes the food availability for long period of time
4. They increase the food availability
5. Fruits and vegetables can be enjoyed in any season with the help of preservatives and antioxidants.

Section B

Q. No. 8 (A)

Speed in 1st half = 40 Km/h
Speed in 2nd half = 60 Km/h
Average speed = ?

Solution

According to weightage average formula

$$\text{Weightage average} = \frac{\text{no of hours} \times \text{Kilometers} + \text{hours} \times \text{Km}}{\text{Total hours}}$$

$$\text{W. Average} = \frac{1\text{h}(40\text{Km}) + (60\text{Km})\,1\text{h}}{2 \text{ hours}}$$

$$\text{W. A} = \frac{40\text{Km} + 60\text{Km}}{2} = \frac{100\text{Km}}{2} = 50$$

W.A = 50 Km/h Average speed.

(B)

ROSE = 6821
CHAIR = 73456
PREACH = 961473
SEARCH = ?

mentioned in first three words.

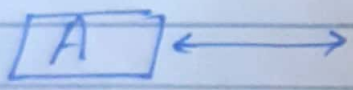
For instance

S = 2 in Rose
E = 1 in both Rose & Preach
A = 4 in both Chair & preach
R = 6 in all three words
C = 7 in Chair and preach
H = 3 in Chair and preach

Hence, SEARCH will be 214673

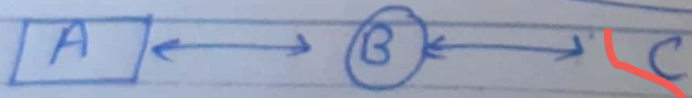
(C)

If A is brother of B

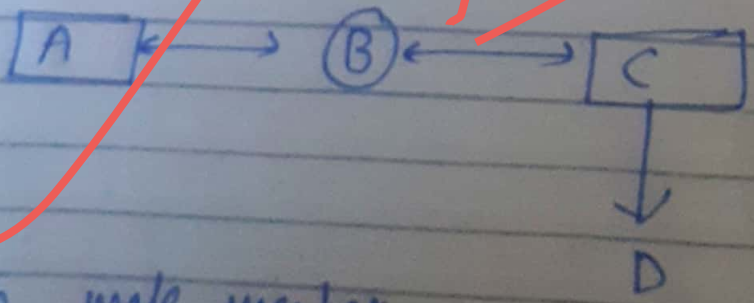


∴ ○ = Female
□ = Male
↔ = Same generation
↓ → Offspring

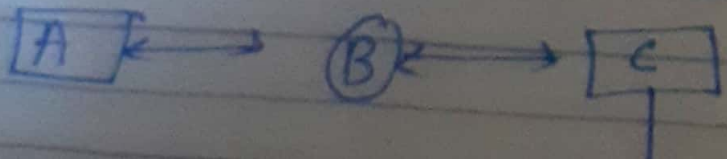
B is sister of C



C is father of D

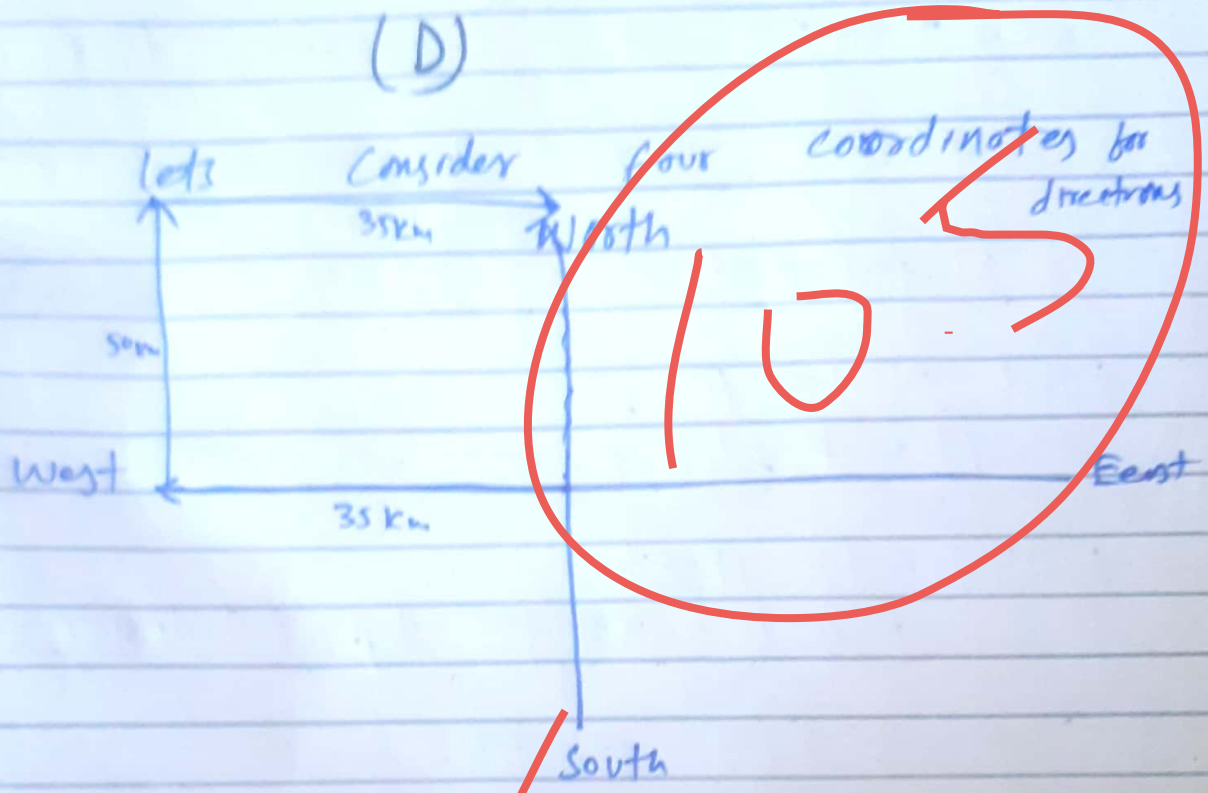


D is a male member



Now According to this family tree D is the Nephew of A.

(D)



Horizontal distance covered by Kashmala

35 km West − 3km East

Total distance = 0 km

Vertical distance

North − South

50km − 0km

= 50km Total

Hence according to diagram and formula, Kashmala only travelled Vertically which is 50 km

Hence Answer is 50km she is 50 km away from the Point

Q.NO: 6

(b)

Fee requirement = 800 Rs.

Brother ~~father~~ = 20% = $\frac{20}{100} \times 800$ = 160 Rs

Mother = 30% = $\frac{30}{100} \times 800$ = 240 Rs

Money in bank = 200

Total money he has

160 + 240 + 200 = 600

Money he needs =

Required money − deposited money

200 = 800 − 600

Hence he requires 200 Rs more

(a)

Total Money = 370 $

First's part = 3

Third part = 5

Second part = $\frac{1}{4} \times 5 = \frac{5}{4}$

Sum of ratios =

$3 + 5 + \frac{5}{4} \Rightarrow \frac{3}{1} + \frac{5}{1} + \frac{5}{4}$

taking L.C.M

$$\frac{3}{1} + \frac{5}{1} + \frac{5}{4}$$

$$\frac{12 + 20 + 5}{4} = \frac{37}{4}$$

For finding each part:

Part of First $= \frac{3}{1} \div \frac{37}{4} \times 370$ or

$$\frac{3}{1} \times \frac{4}{37} \times \overset{10}{\cancel{370}}$$

$$= 12 \times 10$$

120 $

Second part $= \frac{5}{4} \times \frac{4}{37} \times \frac{10}{370}$

50 $

Third part $= \frac{5}{1} \times \frac{4}{37} \times \frac{10}{370}$

Third part = **200 $**

Cross check

Second part $= \frac{1}{4}$ of Third

$$\frac{1}{4} \text{ of } 200 = \frac{1}{4} \times \overset{50}{\cancel{200}}$$

$= 50$

Hence proved

(d)

traffic light A changes = 24s

Traffic Light B changes = 36s

Traffic Light C changes = 72s

Change simultaneously at 8:20:00 hrs

Second simultaneous change = ?

To solve this we take L.C.M of following timings.

2	24, 36, 72
2	12, 18, 36
2	6, 9, 18
3	3, 9, 9
3	1, 3, 3
3	1, 1, 1

L.C.M = 2×2×2×3×3

= 72 seconds

means after 72 seconds they will change simultaneously.

If 1st change occurs at 8:20:00 hrs

Then it will occur second time in 8:20:00 + 72 sec (1m:12s)

8: 20: 00
1: 12

8: 21: 12 hrs

Hence, the answer is =

8 : 21 : 12 hours

(C)

Bag A	Bag B	Bag C
Red = 3	Red = 8	Red = 4
Black = 7	Black = 2	Black = 6
Total 10	Total 10	Total = 10

Total balls = 30

Probability of red ball = $\frac{\text{total red balls}}{\text{Total balls}}$

$P = \frac{15}{30} = \frac{1}{2}$

probability that red ball is drawn from third bag

$\frac{1}{2} \times \frac{4}{10} = \frac{4}{20} = \boxed{\frac{1}{5}}$