

Q # 3

(a) Why cells form organelles? Discuss Mitochondria is human cell.

cell:- Cell is the structural and functional unit of the body which is composed of different types of organelles.

Why cell form organelles:-

In a cell, different functions are being performed at a time. Cells work on the principle of "division of labor".

↳ It means cells composed of organelles and every organelle performs its specialized function. This is called Compartmentalization within cell.

For example :-

Ribosomes → Specialized for protein Synthesis.
Nuclear material → Specialized for DNA replication
This proves that cells form organelles to carry out functions efficiently so

Principle of ~~the~~ Division of labour is followed.

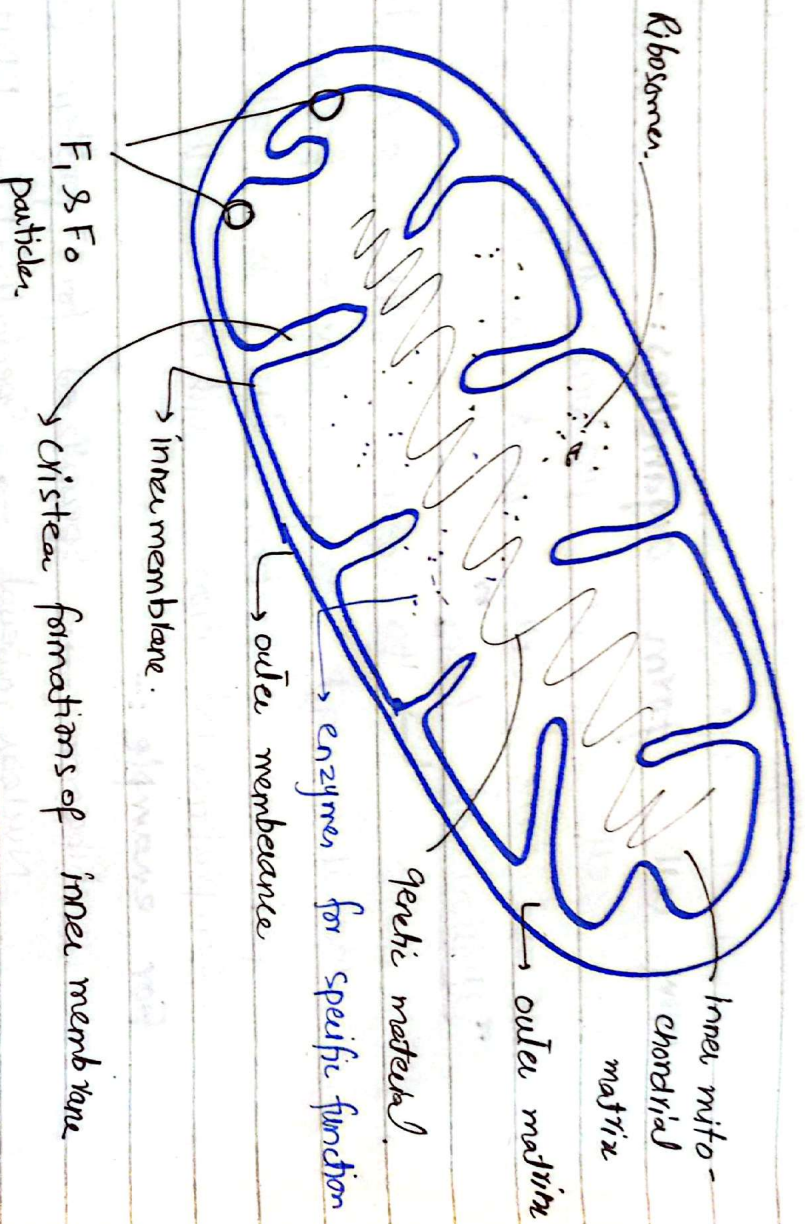
Mitochondria in human cell:-

Mitochondria is a special organelle is the cell which perform the function of energy generation for cell. This energy is then utilized to carry out other activities in the cell.

They are involved in the "ATP production".
ATP:- ATP, Adenosine triphosphate

is the energy currency of the cell.
mitochondria are also called "Powerhouse"
of the cell.

Structural composition :-



Structural elements

- Double membranous organelle, made of lipoprotein basically.
- Autonomous organelle, has its own DNA and ribosome, can survive without cell.
- Matrix contain different proteins and enzymes for specific function.

Functions of Mitochondria :-

→ ATP generation

Basically, Krebs cycle takes place here

→ β -oxidation → Fat break

Other than this, mitochondria carry out different metabolic processes necessary for the functioning of cell.

Importance :-

Experiments are observed that cells ~~contain~~ cannot survive without mitochondria as it is the most necessary energy producing organelle.



Q 3 (b)

What is Doping? Discuss different types ~~what's~~ of semi-conductor?

Doping :- Doping is the process of addition of impurities like phosphorus or Aluminium in a pure semi conductor. This is done to alter the conductivity of semi-conductor.

e.g If Phosphorus element is added to the semi-conductor of Silicon, it ~~can~~ become Doped.

Different types of Semi-conductor:-

Semi-conductor can be classified on various basis. On the basis of purity,

—① **Intrinsic Semi-conductor** These are the pure semi-conductor e.g Semi-conductor of Silicon.

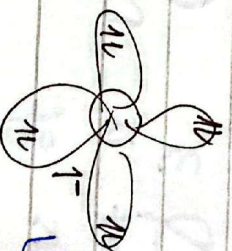
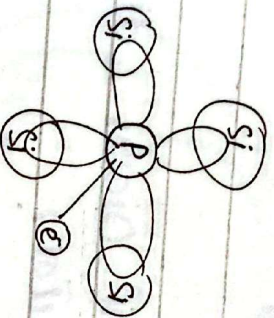
—② **Extrinsic Semi-conductor** These are the doped semi-conductor (impure)

They are further classified on the type of Impurity added.

— ① N-Type Semi-conductor $\Rightarrow$ When a pure semi-conductor is doped with any element from the five group of periodic table like Nitrogen, or Phosphorus, $\rightarrow$ It forms N-Type semi-conductor.

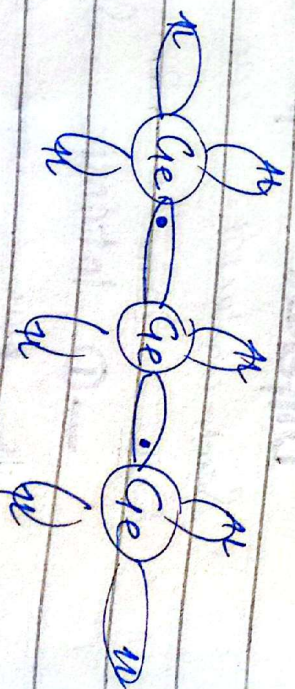
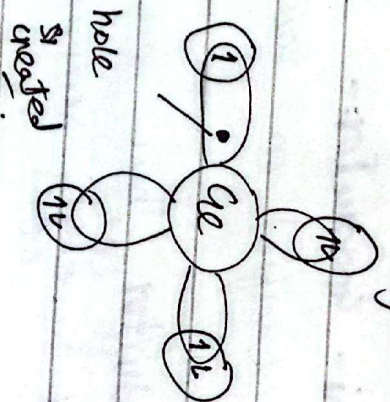
Formation:-

Silicon has 4 electrons in outer shell. Phosphorus has 5 electrons.

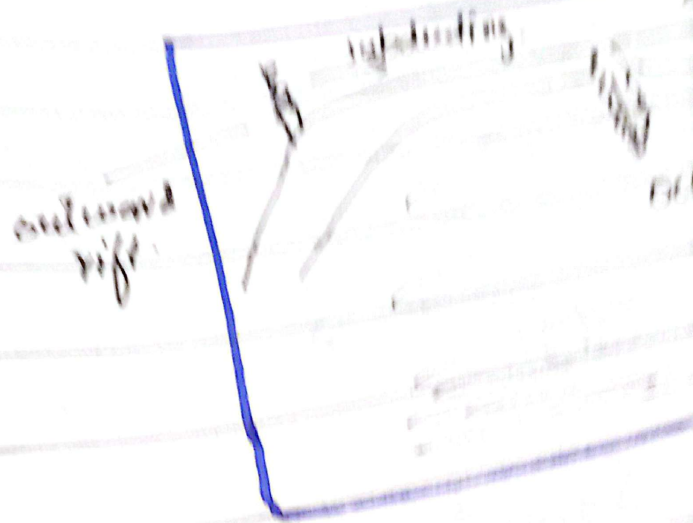


Free electron of the donor atom are left behind (left behind) which then utilized as majority carrier.

② P-type Semi-conductor When a pure semi-conductor is doped with any element from 3rd group of periodic table, it forms the P-type semi-conductor. It results in the production of excess of holes and acts as major acceptor. (Vacancies left behind)



tectonic movement
results in sudden
the crust of the Earth



Merit & Demerit

Volcanic eruption is
than benefits. It
change in the

Merits of

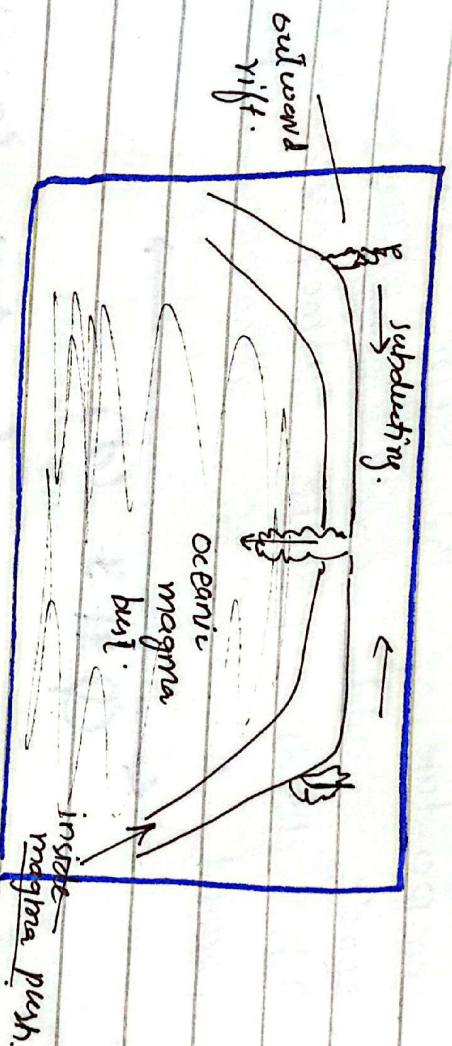
- ① Volcanic
minerals
sides in
merit

Q3(c)

Volcanic eruption :- Merits and Demerits :-

Volcanic eruption :-

Volcano is outbursting of magma from a vent on the earth surface or on the ocean crust. Volcanic eruption is the process triggered by tectonic movements or subducting rifts that results in sudden outburst of magma from the crust of the Earth toward outside.



Merit & Demerits :-

Volcanic eruption is characterized more than benefits. It results in whole ecological change in that place.

Merits of Volcano :-

- ① Volcanic eruption is associated with minerals exploitation. Magma from their sides is collected and analyzed to discover different minerals founding in side Earth.
- ② Volcanic ash can be beneficial for the agricultural productivity if utilized properly.
- ③ It can be used for the geothermal energy production and enhancement in energy productivity.

Demerits of Volcanic eruption:-

- ① Volcanic eruption is associated with Earthquake and Tsunami in aftermaths further widening ecological imbalance of that area.
- ② Land productivity is distorted due to volcanic eruption
- ③ Lava flowing causes a lot of structural damages.
- ④ Temperature of the region raise to 200°C and become inhabitable
- ⑤ Ash clouds pollute atmosphere putting forward a lot of atmospheric problem.

Q # 3 (d)

What is dengue? Symptoms - Causes - Remedies

Dengue is a viral disease spread by mosquito bites. Usually female mosquito **Aedes Aegypti** is involved in infection spreading. This disease has been observed in all over the tropics mainly habituating in warm seasons. Several awareness campaigns had been also launched to prevent its spread.

Symptoms:- Dengue fever is associated

with severe fever lasting for 2-7 days.

It is also called "Haddi Tor bukhar" in

Pakistan. In this condition, Patient felt severe pain in all over his body. The eyes mainly headache, pain behind the eyes

pain in joints, muscles and specifically behind the neck.

After the mosquito bit, 2-10 days are the incubation period in which symptoms are minute and starts appearing. After that, suffering period occur, lasting for 2-7 days in which patient feel a prey to severe fever and pain all over the body.

Causative Agents:-

This disease is spread through a number of female mosquito mainly of Aedes family. like Aedes Aegyti.

This due to mosquito being infected due to virus. Main virus is of 4 Type

DEN-1, DEN-2, DEN-3, DEN-4.

This virus propagates its infectious cycle in the mosquito reproductive cycles and then spread it in the body of humans after biting. It mainly affects the immune system of the body weakening the blood cells and defence system of body.

Remedies

Treatment $\Rightarrow$ No exact treatment to cure it completely has been discovered yet.

Immunization:-

Some specific vaccines are available to prevent disease spread.

- Prevention → most necessary is to prevent mosquito production for prevent the spread of disease.
- It involves checking properly cleanliness measures and proper waste disposal.
 - Using insecticides spray to prevent mosquito development
 - Properly checking and spraying greenery facilities.



Q#3 (A)

Write note on plant "Chlorophyll"

Chlorophyll is the ~~organelle~~ organelle found in plants only.

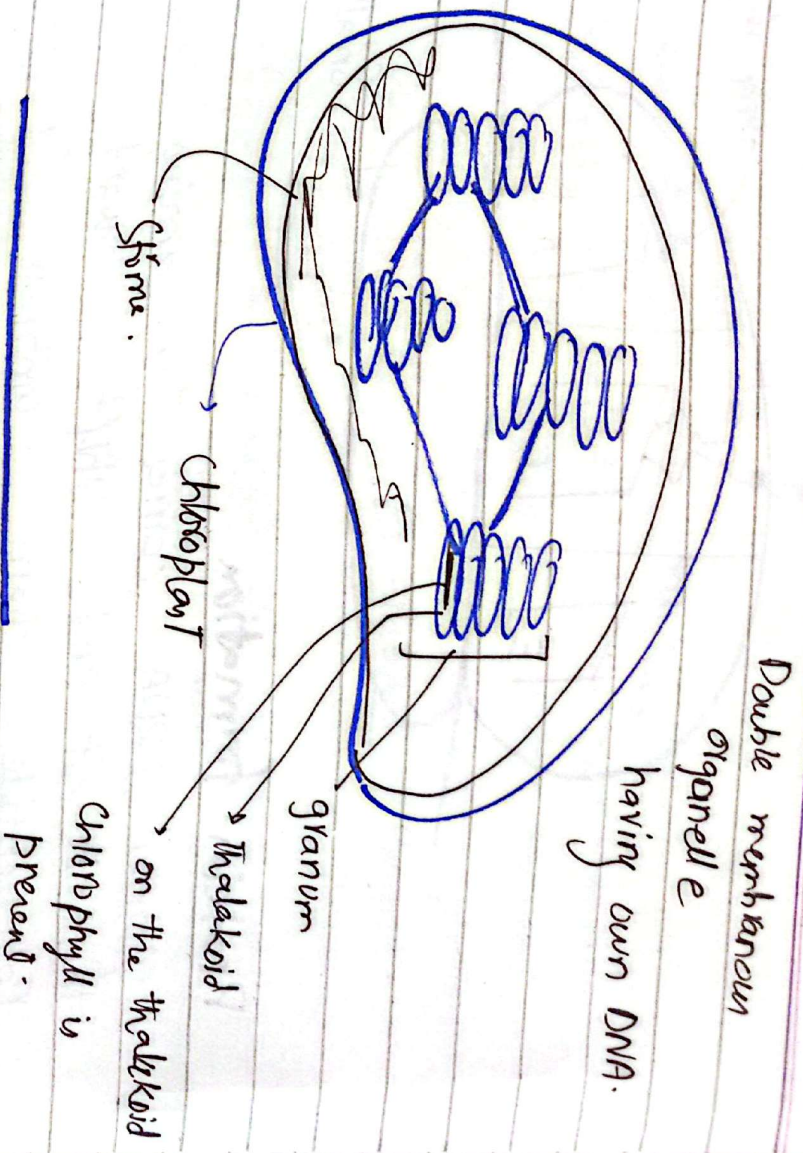
It is associated

Chlorophyll is the pigment found in plant organelle chloroplasts. It is of green color and involved in photosynthesis.

It absorbs the sunlight and carry out the light reactions which eventually results in the produce of ATP also.

→ There are 2 form of chlorophylla "a" and "b"

→ There are present on the thylakoid membrane of the chloroplast and there are present in the stomata of the mesophyll cell.



(b) Role of Ribosomes in Protein Synthesis

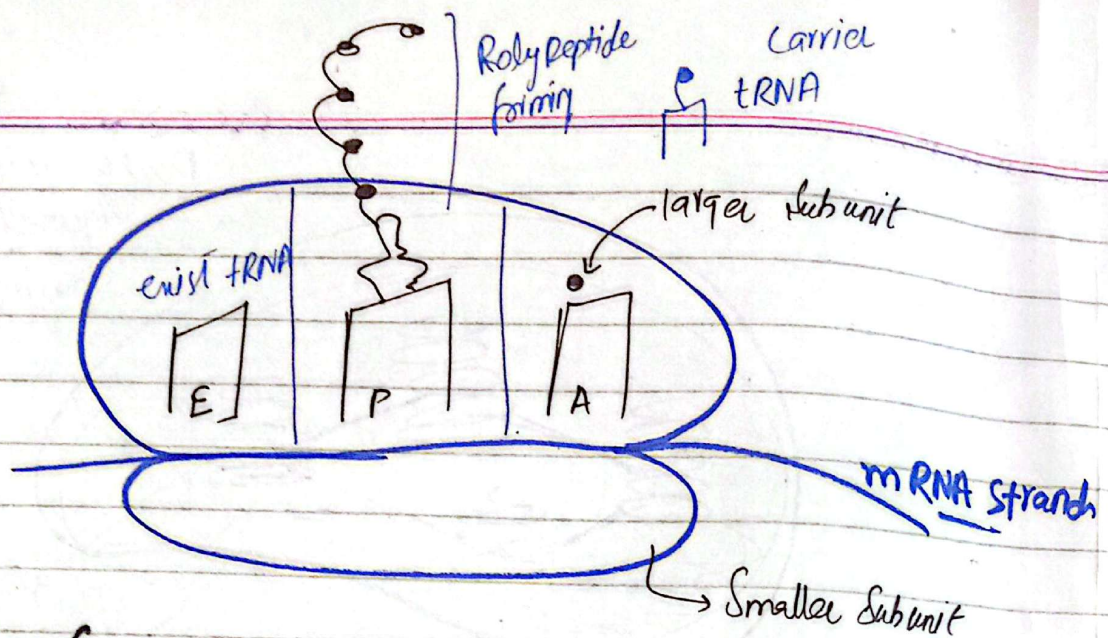
Ribosomes are the ribonuclear particles made up of 50% of rRNA and 50% protein. It is called factory for protein synthesis. as it is.

→ Ribosomal RNA is the main functional unit of Ribosome.

→ It is made up of 2 subunit
 50S → larger subunit
 40S → smaller subunit
 bind by Mg ions.

→ Together forms → 80S unit.

→ There are 2 types. ① fixed with endoplasmic reticulum
 ② freely floating

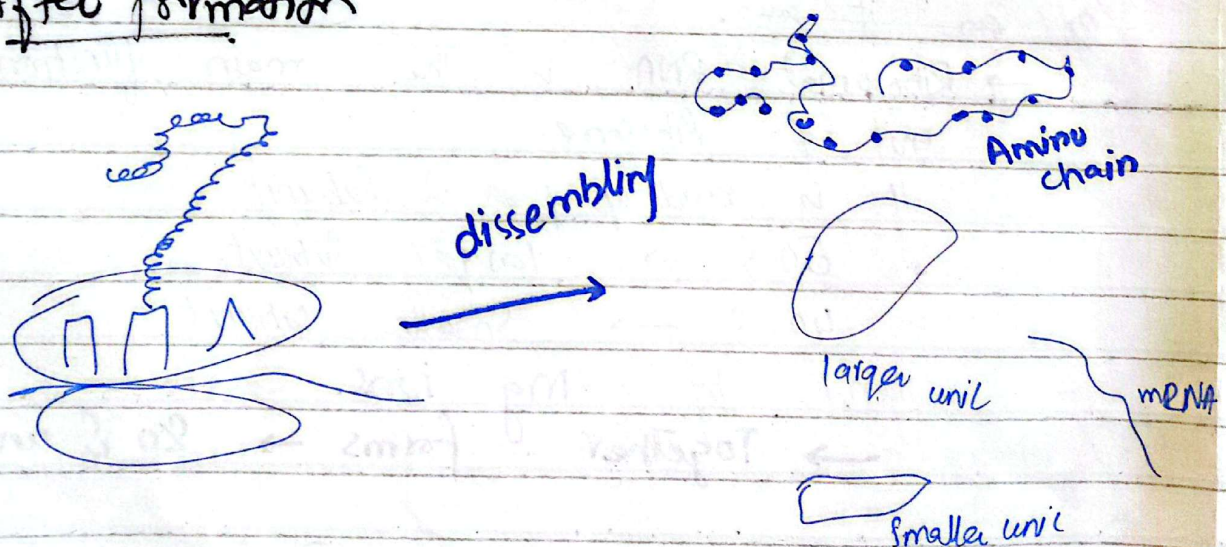


Protein formation

Carrier tRNA carries the amino acid toward the A-site and shift toward P-site. Poly peptide chain continue to form at the P-site — as peptide bonds are formed the tRNA exits Ribosome at E-site.

Ribosome assemble during peptide formation and then gets separated again.

After formation



This chain then goes to ER and golgi for further processing.

Q# 3 (c)

Define the terms →

~~Hydrometer~~ →

Biofuel → Biofuel is the fuel produced from the biological material like bioman or bio wastes. organic wastes production.
→ fresh include Bio ethanol, Biogas.

Adulteration → Addition of harmful substance to the food which lower the food quality or efficiency is called Adulteration.
e.g.

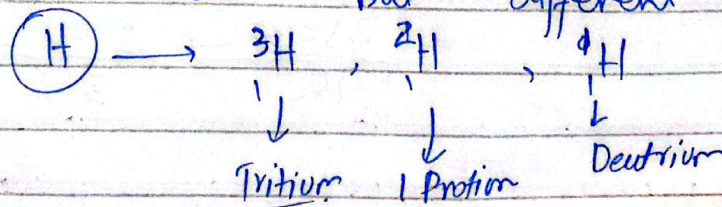
Addition coloring agent.

Hydrosphere Aquatic part of Earth is called hydrosphere.

It include all the ocean, river, lake and all water resource of Earth.

Troposphere → First layer of atmosphere consisting of clouds, vapour from 8 to 18 km in the atmosphere. The temp in it is decrease while going up.

Isotope Substance having same atomic number but different mass no.



② Methods of Solid waste manage

- ① collection from the sources
- ② Composting $\rightarrow$ manure usage
- ③ Recycling $\rightarrow$ reusing.
- ④ Anaerobic digestion $\rightarrow$ burning with enzyme
- ⑤ Incineration $\rightarrow$ burning at high T
- ⑥ Sanitary landfills. $\rightarrow$ Dumping in Earth
- ⑦ Hazardous waste $\rightarrow$ burning in container management.

(Sec II)

(a) Volume of sphere
 $= \frac{4}{3} \pi r^3$

$r = \frac{d}{2} = \frac{14}{2} = 7 \text{ cm radius}$

Volume = $\frac{4}{3} \times \frac{22}{7} \times 7 \times 7 \times 7$
 $= 1437 \text{ cm}^3$

(b) ratio = 1:2:3:4:5 = 15 total
Smallest share = ? = $\frac{\text{Share}}{\text{Total}} \times \text{Income}$
 $= \frac{1}{15} \times 25000$
 $= \frac{25000}{15} = \frac{5000}{3} = 1666.67$

c. error in series

① 2, 6, 18, 54, 162, 486

2, 6, 18, 54, 162, 486

→ pattern follows in multiply by 3.

2, $2 \times 3 = 6$, $6 \times 3 = 18$, $18 \times 3 = 54$, $54 \times 3 = 162$, $162 \times 3 = 486$

→ All fit → no error.

② 3, 5, 7, 11, 13, —

There are prime number

next is (17) A.

d) Triangle sides 5, 12, 13.

let suppose 13 is hypotenuse
by Pythagoras

$$(13)^2 = (5)^2 + (12)^2$$
$$= 25 + 144$$

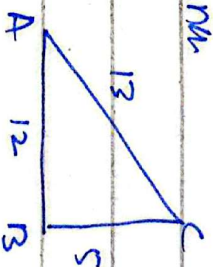
$$169 = 169$$

$$\theta = B' = 90^\circ$$

$$\sin \theta = \frac{\text{Per}}{\text{hyp}} = \frac{5}{13}$$

$$\theta = \sin^{-1} \frac{5}{13} = \sin^{-1} \frac{5}{13} = 22^\circ$$

$$\angle C = 90^\circ - 22^\circ = 67^\circ \text{ approx.}$$



Q. 8

Total distance covered.

$$\text{Triangle} = 7 + 24 + 25$$

$$= 56 \text{ km}$$

$$\text{Additional} = 15 \text{ km}$$

$$\text{Total} = 56 + 15 = 71 \text{ km}$$

Distance from start $\rightarrow 10 \text{ km}$, then $\perp 5 \text{ km}$.

$$= \sqrt{10^2 + 5^2} = \sqrt{125} = \sqrt{5 \times 5 \times 5} = 5\sqrt{5} \text{ km.}$$

(b)

9000 total

$$A = \frac{1}{2} B$$

$$B = 3C$$

$$C = 4D$$

$$D = 2E$$

$$E = F$$

$$\text{let } x = F$$

$$E = x$$

$$D = 2x$$

$$C = 8x$$

$$B = 3C = 24x$$

$$A = 12x$$

$$\left. \begin{array}{l} A = 12x \\ B = 24x \\ C = 8x \\ D = 2x \\ E = x \\ F = x \end{array} \right\} \rightarrow \text{Sum Total} = \boxed{48x}$$

$$48x = 9000$$

$$x = F = 187.5 \text{ Rs}$$

$$E = 187.5 \text{ Rs}$$

$$D = 2x = 375 \text{ Rs}$$

$$C = 8x = 1500 \text{ Rs}$$

$$B = 24x = 4500$$

$$A = \frac{1}{2} B = \frac{4500}{2} = 2250 \text{ A}$$

$$x = \frac{9000}{48} = \boxed{187.5}$$

②

$$\begin{aligned}\text{Area} &= 2(lw + lh + wh) \\ &= 2(8 \times 6 + 8 \times 4 + 6 \times 4) \\ &= 208 \text{ A.}\end{aligned}$$

$$\boxed{\text{Area} = 208 \text{ m}^2}$$

$$\begin{aligned}\text{Volume} &= l \times w \times h = 6 \times 8 \times 4 \\ &= 192 \text{ m}^3.\end{aligned}$$

d