Section II

Question - 7

Part (a):

Volume of a sphere = ?

Diameter of sphere = 14cm

$$\because \quad V = \frac{4}{3}\pi r^3 \quad \text{—①}$$

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

Putting back into ①:

$$V = \frac{4}{3}\left(\frac{22}{7}\right)(7)^3$$

$$V = \frac{4}{3} \times \frac{22}{7} \times 343^{49}$$

$$V = \frac{4312.0}{3}{}^{1437.3}$$

$$V = 1437.3 \text{ cm}^3$$

$$V = 0.001437 \text{ m}^3$$

Part (b):

Five's friend' total saving = 25000 Rs

Ratio = 1 : 2 : 3 : 4 : 5

Smallest share = ?

let a, b, c, d, e are five friends with respective share 1 : 2 : 3 : 4 : 5.

$$a\text{'s share} = \frac{\text{share}}{\text{sum of all share}} \times \text{Distribute}$$

$$= \frac{1}{15} \times 25000$$

$$= \frac{25000}{15} = 1666.6$$

a's share = 1666.6

$$b\text{'s share} = \frac{2}{15} \times 25000$$

$$= 2 \times 1666.6$$

b's share = 3333.3

$$c\text{'s share} = \frac{3}{15} \times 25000$$

$$= 3 \times 1666.6$$

c's share = 4999.9

d's share $= \frac{4}{15} \times 25000$

$= 4 \times 1666.6$

d's share = 6666.4

e's share $= \frac{5}{15} \times 25000$

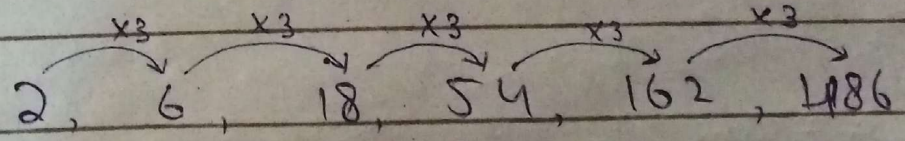
$= 5 \times 1666.6$

e's share = 8333.0

So, smallest share is 1666.6-

Part (c):

(i) 2, 6, 18, 54, 162, 486



Each number is multiplied by 3 gives next term. So each number is fit according to series.

(ii) 3, 5, 7, 11, 13, ——?

It is a series of prime no. starting from 3. Next term will be 17.

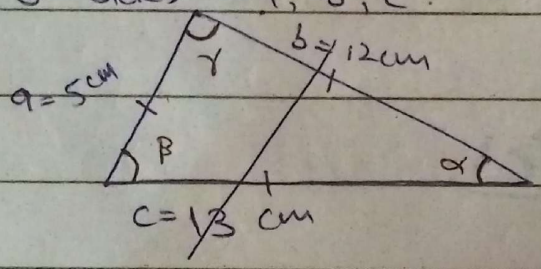
3, 5, 7, 11, 13, 17.

Part(d):

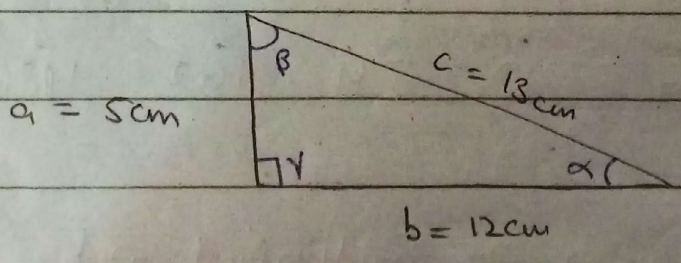
A triangle' side = 5cm, 12cm, 13cm

Find all 3 angles = ?

let all 3 sides a, b, c.



let all 3 angles = α, β, γ



As γ-angle = 90° —— (A)

$\tan\alpha = \frac{\text{attitude}}{\text{base}}$ —— (1)

$$\tan\alpha = \frac{5}{12} \approx 0.41$$

$$\alpha = \tan^{-1}(0.41) \quad \text{— (B)}$$

for β angle:

$$90^\circ - \alpha = \beta \quad \text{— (C)}$$

Without calculator exact value is difficult to find.

Question - 6

Part(a):

Packets of candies in flavors with ratio.

Flavors = Ratio

Apple : Berry : Cherry : Date = 3 : 6 : 2 : 5

Apple exceed Date candies by 35.

How many Berry candies = ?

Sum of all ratio = 3+6+2+5

= 16

No. of Berry candies = $\frac{6}{16}$

=

Let apple candies = $3x$

and date candies = $5x$

As per condition:

apple exceeds date by 35.

$$3x = 5x + 35$$

$$-2x = -35$$

$$x = -17.5$$

Ignoring the negative sign and taking absolute value

$$x = 17.5$$

As Berry candies = $6x$

$$= 6(17.5)$$

Berry candies = 105.0

Part(b):

Camera Priced = 200$

Discount = 25%

Tax = 6%

Paid Amount = ?

$$\text{Discount on price} = \frac{25}{100} \times 200$$

Discount = 50

Price after Discount = 200 − 50

= 150 $

Now tax on price after discount

6% of 150 $

$= \frac{6}{100} \times 150$

tax = 9 $

Paid Amount = 150 + 9

Paid Amount = 159%

Part (c):

Distance = 36 km

Speed = 18 Km/hr

time = ?

$V = S/t$

$t = S/V$

$t = \frac{36\,Km}{18\,Km/hr} = 2\,hr$

t = 2 hr = 120 minutes = 7200 sec.

So, if it starts at 1 pm then it will reach at 3 pm.

Part (d):

(i) STSTAICITS

STATISTICS

(ii) LGEBMAR

GAMBLER

Section-I

Question-3

Part(a):

Why Cells form Organelles:

Cells form organelles to divide their work and perform each work more efficiently. There is a need of organelles for some specific purpose like

a) To prevent interference during metabollic process

b) To give space for enzyme and substrate.

Examples: There are some exauples:

Mitochondria provides energy to cell.

Ribosomes involve in making of protein.

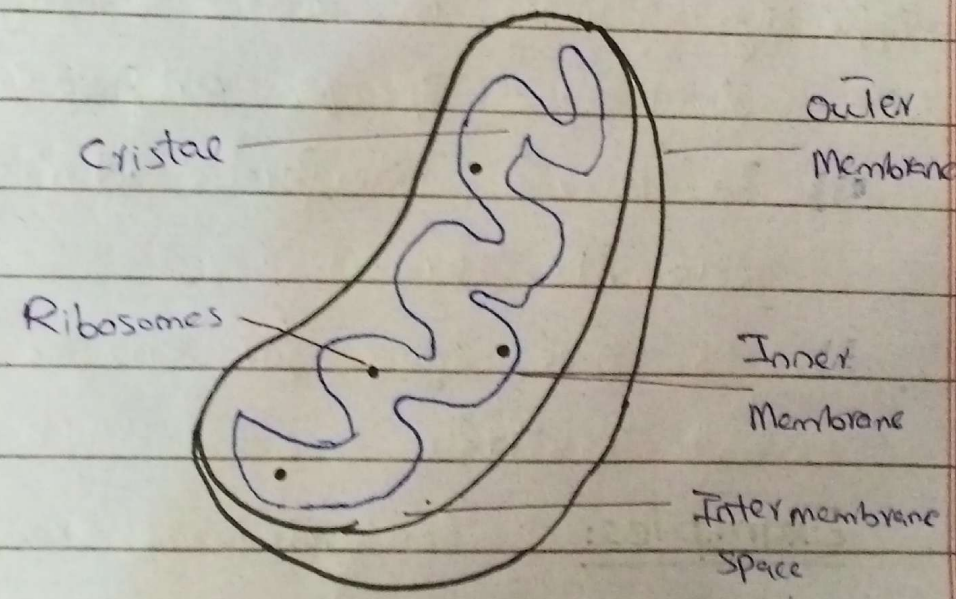
Lysosomes help to digest waste material of the cell.

Mitochondria:

Definition:

Mitochondria is an organelle which involve in energy production in the cell to perform cellular activities. It is also known as "Power house of the cell".

Structure:



Mitochondria is a **double membrane** organelles:

Outer Membrane is smooth and protective part.

Inner Membrane is folded into cristae containing ribosomes, DNA and enzymes and also give surface area for reaction.

Function:

Mitochondria perform "Cellular respiration" and produce energy, by oxidizing glucose, in the form of ATP [Adenosine Triphosphate].

$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + \text{Energy}$$

This energy use in muscular function, brain activity and other body process.

Part(b):

What is doping:

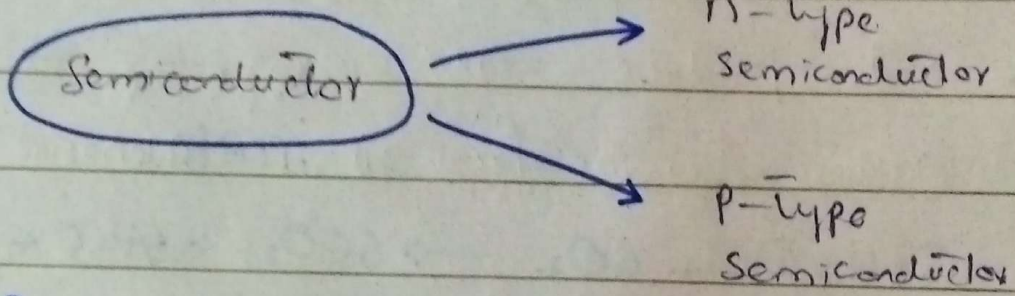
Doping is a process in which impurities are added into pure semi-conductor like Silicon, Germinium.etc.

Purpose of Doping:

The main purpose of doping is to increase electrical conductivity of semi-

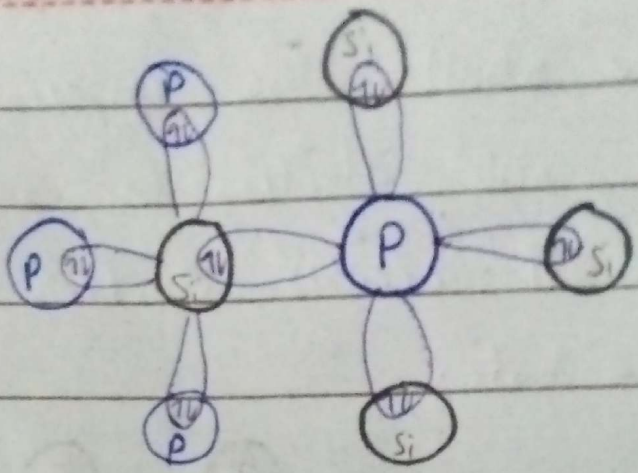
conductor because it increases the desired number of atoms or electron, hole. So it will be useful to make transistors, chips, diode etc.

Types of Semiconductor:



(i) n-type Semiconductor:

n-Type semiconductor is formed by adding **pentavalent element** belongs to fifth group such as **Arsenic**, Phosphorous, Antimony to Silicon.



Si have four $\bar{e}$s and P have 5 valence shell $\bar{e}$. four electrons bond form when with Phosphorous but one electron of P remains free to move, increasing **negative** charge carriers.

P-type Semiconductor:

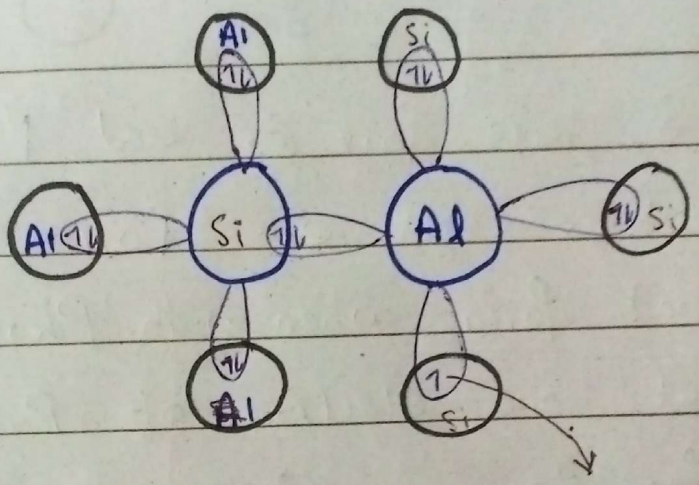
Definition:

P-Type semiconductor is formed by adding **trivalent element** belonging third group. such as **Aluminium** (Al), Boron (B) to silicon (Si)

Explanation:

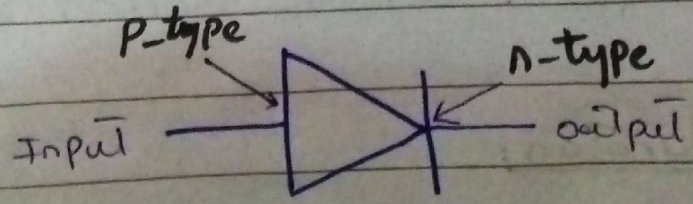
As Si have four valence electrons and Al have three electrons in

valence shell. The impurity atom (Al) lacks one electron to complete the bond. It creates electron vacancy as a hole.



Uses of Semi-conductor

When p-type and n-type semi-conductor are joined, they form a **p-n-junction diode** which allows current flow in one direction only. like **LED, Solar cells etc.**



(Diode)