

SECTION: T
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QUESTION NO: 03
Dos and Don'ts for General Science & Ability Paper

Hi there, you've done well. Know that acquiring knowledge is one thing and reproducing it in paper according to what's asked is another. There are a few things I would like to highlight.

1. A 5 marks part requires at least 2 and at max 3 sides of a paper. Know that there can be two or three parts of a question and their marks are divided accordingly. So, address all of them in a just manner.

2. Focus on time management. You get 35 minutes to solve one question and about 8 minutes per 5 mark part. Manage your time accordingly.

3. You need to understand that your paper is supposed to look more scientific than theoretical. So, add flowcharts and diagrams where required.

4. Your handwriting and neatness can be really impactful. Avoid cutting and overwriting.

5. Focus on your spellings and your grammar. Here, in GSA there's no deduction in marks but your expression will definitely create an impact.

6. In ability portion, give explanation for analytical ability question in words. You need to understand that a 5 mark part requires all steps written and explained.

Good luck for CSS 2025. You're gonna rock in sha Allah. :)

Example:

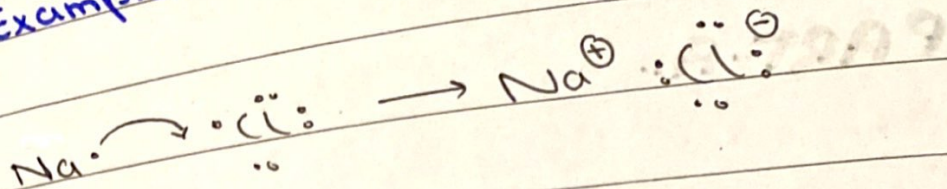


Figure: formation of ionic bond in NaCl

Na transfers electron and chlorine gains electron to satisfy octet rule.

COVALENT BOND FORMATION IN A WATER MOLECULE:

Formation of covalent bond can be defined as

"Sharing of electrons among atoms in order to satisfy the octet rule."

Water molecule also contains covalent bond among 1 atom of oxygen and 2 atoms of hydrogen to satisfy octet rule

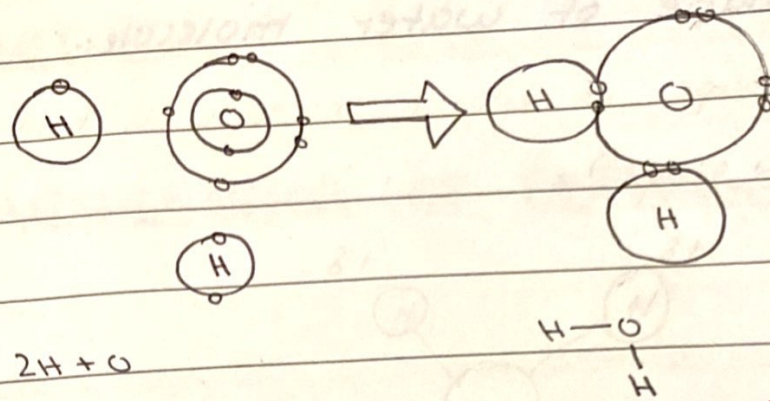


Figure: water molecule

Showing covalent bond

There are following characteristics present in covalent bond of water molecule:

(i) **Bond type of water molecule.**

Bond type of water molecule is polar covalent. As oxygen atom has high electronegativity so attracts ~~the~~ electron more towards itself. Oxygen atom acquires partial (- δ) negative charge and hydrogen atom acquires (+ δ) charge.

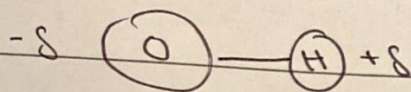


Figure: Polar covalent

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(ii) Shape of water

Shape of water molecule is bent (V shape)

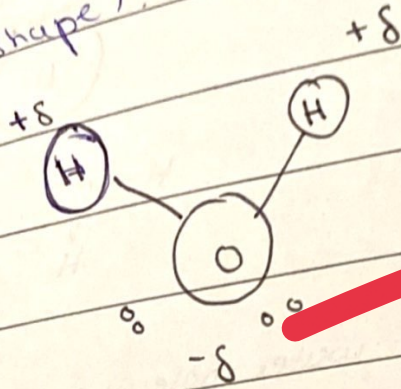


Figure: Bent shape of H₂O

(iii) Hydrogen bond (Van der Waal forces):

Hydrogen bond or Van der Waal forces are present between hydrogen of water molecules &

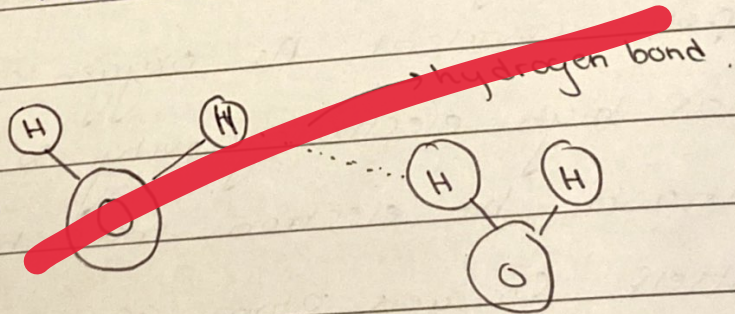


Figure: hydrogen bond in H₂O molecule.

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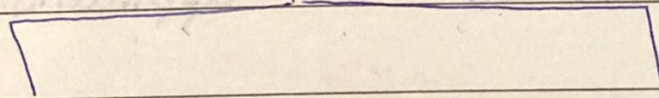
PART-B:

PHENOMENA OF DOPING:

Doping process can be defined as:

" Adding some impurity atoms in a pure or intrinsic semiconductor to increase conductivity of a semi-conductor."

Doping can be done in two ways



(i) n-type or pentavalent dope

is added to an

intrinsic semi-

conductor

(ii) P-type or

trivalent

is added to

an intrinsic

semi-conductor

N-type
doping

P-type
doping

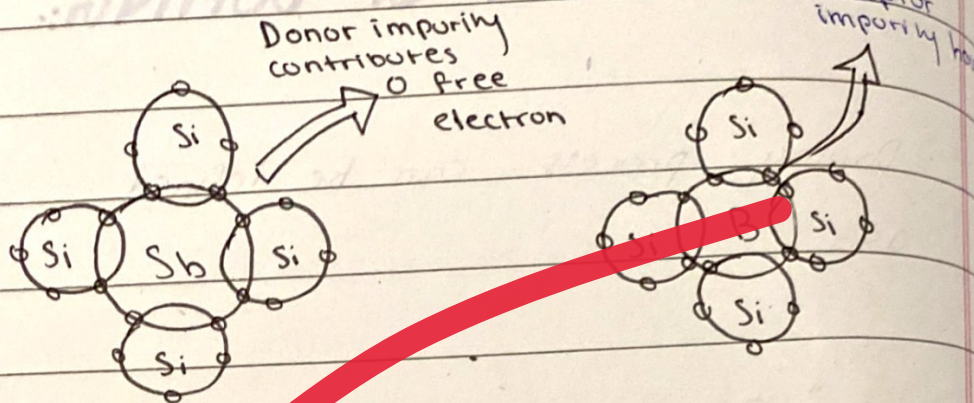


Figure: N and P-type dopants.

DIFFERENT TYPES OF CERAMICS:

Different types of ceramics based on their application

Application	Types	Properties	Eg
(i) Glasses	Windows	noncrystalline silicates	Bottles
(ii) Clay products	Structural products	Abundant clay material	Roof tiles

(iii) Refractories high temp. capable of standing high temp. Furnace walls

(iv) Abrasive ceramics Hardness, wear resistance grinding, cutting of material Sand-paper

(v) Cement Slurry that sets and hardens Any shape can be formed mortar

(vi) Advanced ceramics Exploiting mechanical, electrical properties Fine-tuned application heat engines

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PART (C):

MERITS AND DEMERITS OF GLOBAL WARMING:

Global warming can be defined as

" Rise in temperature of earth's atmosphere due to entrapment of Green House Gases."

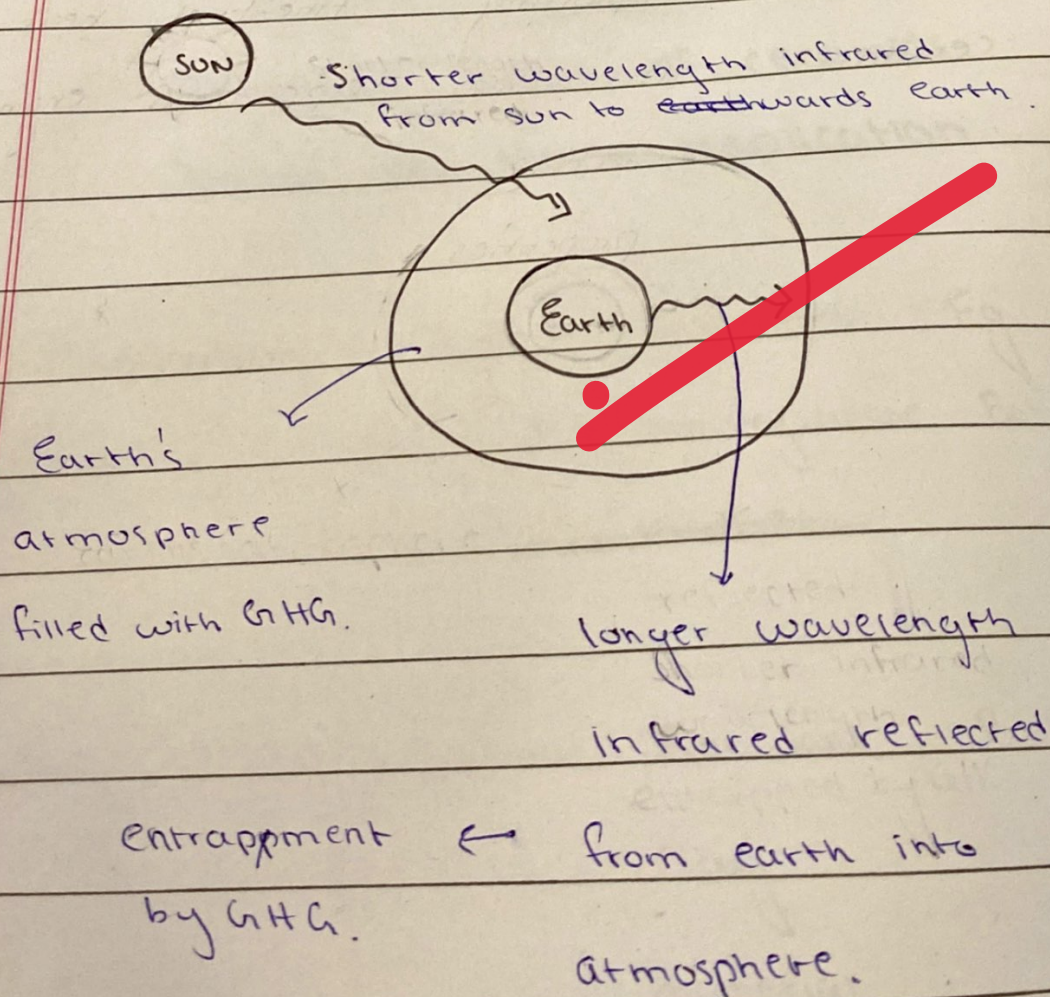


figure :- Phenomena of Global Warming

MERITS OF GLOBAL WARMING:

(i) Maintaining the earth's temperature:

Global warming involves entrapment of heat by Green House Gases (GHG). Subsequently, it maintains temperature of earth's atmosphere conducive for living.

(ii) Growth of plants in frozen region:

Global warming helps growth of plants in frozen regime regions of Arctic and Antarctica.

(iii) Milder climate in frozen region:

Global warming helps to create milder climate for habitation in Siberia, Arctic, Antarctica.

(iv) For Availability of gas and oil reserves:

Formerly untapped oil and gas reserves can be made available.

DEMERITS OF GLOBAL WARMING

(i) Rise in temperature of Earth's atmosphere:

Global warming is causing rise in temperature of the earth's atmosphere and ~~is~~ presenting adverse effect on living conditions.

(ii) Increase in natural disaster:

Global warming cause melting of polar ice caps and increase in Glacial Lake Outburst Floods, droughts and change in precipitation pattern.

(iii) Loss of species:

Global warming is causing extinction of species due to rise in temperature.

(iv) Loss of coastal land:

Rise in sea level is causing

incursion of seawater on land
and subsequently loss of coastal
land.

PART: D

THE DISEASE OF POLIO:

Poliomyelitis can be defined as:

“Inability to move or
muscle weakening of
limbs due to the affect of
polio virus on central
nervous system.”

(i) Cause of disease:

It is a polio virus which
is contagious and caused by
“Picornoviridae”

(ii) Mode of transmission:

Feco-oral route, spreading by food or water contamination and to lesser extent contaminated saliva.

(iii) Symptoms of polio:

Symptoms of polio includes:

- (a) Headache, fever, vomiting
- (b) Abnormal reflexes
- (c) Back pain
- (d) Muscle spasm.

CHALLENGES IN ERADICATION OF POLIO IN PAKISTAN:

(i) Resistance to vaccination:

Parents are not inclined towards getting their children vaccinated of polio.

(ii) Contamination of water supply:

Poor life style including contamination of sewerage water accelerates spread through feco oral route

(iii) Harsh climate areas access is difficult:

Access in some areas with harsh climate and geographical terrain is difficult.

It provides hinderance in vaccine administration by polio workers

(iv) Insecurity of the polio workers:

Polio workers administrating vaccine are subject to extremism and faces issue of minority.

(v) Ineffectiveness of health care system:

Ineffective reforms presented by health care system, and lack of governance

QUESTION NO:04

PART (A):

LIVER JUICE KNOWN AS BILE:

Bile can be defined as

"An aqueous solution secreted by liver for the digestion of lipids."

(i) Secretion and storage of bile:

Bile is secreted by the hepatocytes of liver and stored in gall bladder.

(ii) Composition of bile:

Composed of:

(a) 95% water

(b) 0.7% bilirubin salts

(c) 0.2% bilirubin

(d) 0.51% fats

(iv) Functions of bile:

Functions of bile are:

- (a) emulsification of fats
- (b) elimination of cholesterol
- (c) excretory route of bilirubin
- (d) digestion of cholesterol, vitamins

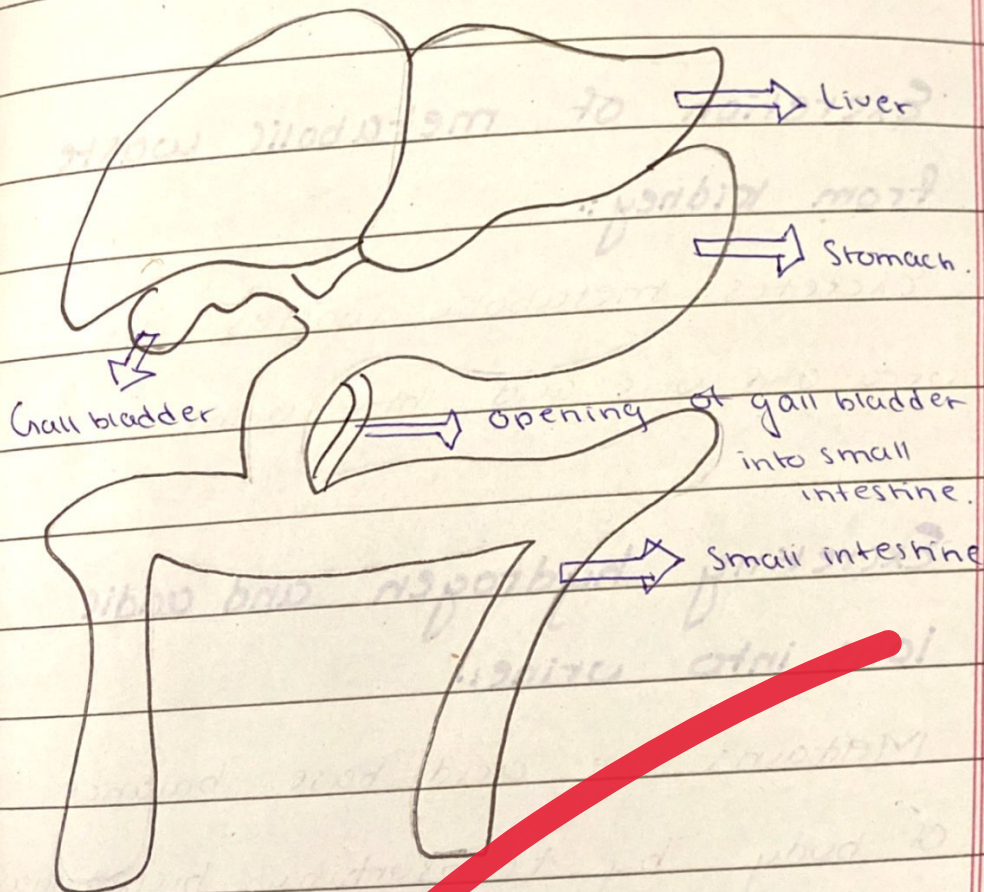


Figure: Gall bladder storing bile from liver, and secreting into small intestine.

PART B:

THE ROLE OF KIDNEY IN EXCRETION:

Following is the role of kidney
in excretion:

(i) Excretion of metabolic waste from kidney:

Excretes metabolic wastes like
urea and uric acid into urine

(ii) Excreting hydrogen and acidic ions into urine.

Maintains the acid base balance
of body by reabsorbing bicarbonate
from urine and excreting hydrogen
ions and acidic ions into urine.

(iii) Excretion of excess fluid from body:

Kidney secretes excretes excess
fluid from body during urine

formation

(iv) Secretion of hormones:

Secretes hormones that help in acid regulation

(a) Erythropoietin: In response to hypoxia

(b) Renin :: Controls blood pressure

(c) Calcitriol: Absorption of calcium in intestine.

(v) Controlled excretion of ions, water and other substances for homeostasis:

Kidney maintain homeostasis through controlled excretion of ions and water substance.

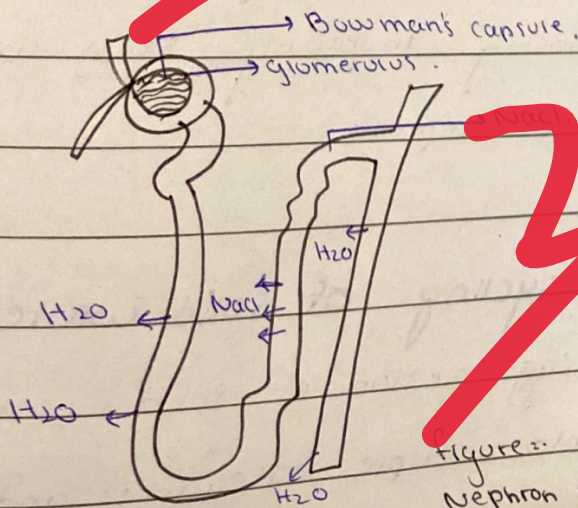


Figure: Nephron excreting absorbing molecules

PART C:

DIFFERENT TYPES OF SOLID WASTE MANAGEMENT:

Solid waste management can be defined as

" Proper collection, segregation and disposal of solid waste through various methods."

Following are the different types of solid waste management:

(i) Incineration of solid waste:

Hazardous solid material is burned at a high temperature.

Mostly involving solid waste from hospitals.

(ii) Recycling of solid waste:

Segregation of solid waste into multiple categories and

recycling through conversion of
waste material into new products

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(iii) **Land fill disposal of solid waste.**

Land fill is a pit or mound of
earth where solid layout is buried.

(iv) **Composting of solid waste products.**

Aerobic method of decomposing

organic solid waste &
of organic & material recycling

PART: D

(i) **ANEMIA:**

Anemia can be defined as

" Decrease in total amount
of Red Blood Cells (RBC)

either through excessive
loss or increased

destruction of RBC."

(ii) APPENDICITIS:

Appendicitis can be defined as

"Inflammation of appendix"

due to viral or bacterial

infection or tumour

(iii) SPLEEN:

Spleen can be defined as

"An organ of the circulatory

system which is involved

in the regulation of
Red Blood Cells (RBC)."

(iv) MYOPIA:

Myopia can be defined as,

"Near-sightedness where

light from distant objects

focuses in front of retina,

as a result distant objects seem blurry

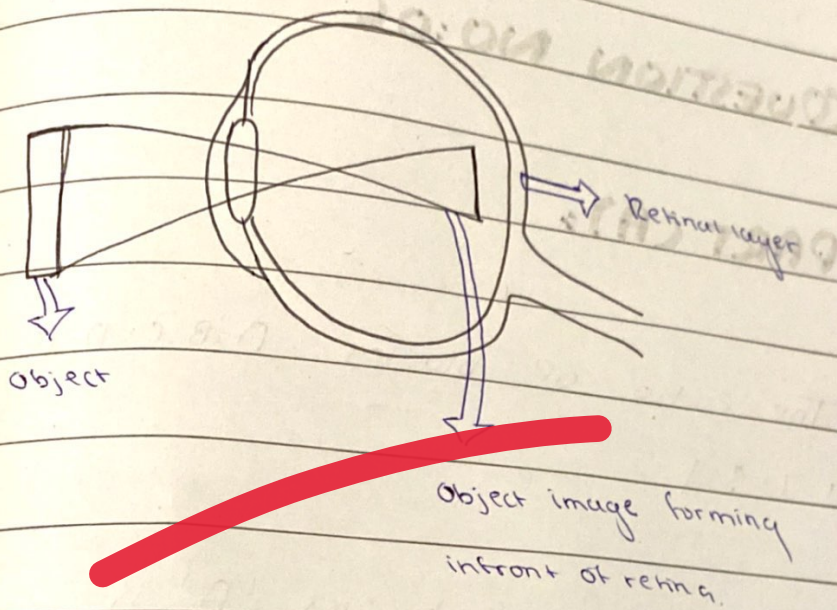


Figure:- Myopia (short-sightedness)

(1) ISOTONES:

"Isotones are nucleides of different chemical element, with same neutron number but different proton number."

Example:

Oxygen ${}^{16}_{8}\text{O}$ (p=8, n=8)

Nitrogen ${}^{15}_{7}\text{N}$ (p=7, n=8)

Carbon ${}^{14}_{6}\text{C}$ (p=6, n=8)

SECTION-II

QUESTION NO:06

PART (A):

The ratio of blocks A:B:C:D is
 $4:7:3:1$

The number of blocks 'A' is
50 more than the (C) blocks.

Let the number of blocks

A, B, C, D be $4x:7x:3x:x$.

According to equation of
scenario:

The number of A blocks - number
of C blocks = 50.

$$4x - 3x = 50.$$

$$x = 50.$$

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Substituting the value of x to
find value of B .

$$\text{Number of B blocks} = 7x$$

$$= 7 \times 50$$

$$= 350$$

Hence, the number of B blocks
in the given scenario is 350.

PART (B):

The original cost of pair of
shoes is = 80

Discount on pairs of shoes = 15%

$$= \frac{15}{100}$$

$$= \frac{3}{20} \times 80$$

$$= 12$$

$$\text{Discounted price} = 80 - 12 = 68$$

Sales tax applied = 10%

~~$$= 6$$
$$= \frac{768}{10}$$~~

~~$$= 6.8$$~~

Price after application of sales tax = 74.8

PART (C):

Travelling distance of train = 42 km.

Speed of train is = 36 km/hr.

Departure time of train = 4 pm.

Arrival time of train = ?

Using the formula of speed

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

Putting the values of distance
and speed in above formula.

$$= \frac{42 \text{ km}}{36 \text{ km/hr}}$$

$$\text{time} = 1 \frac{1}{6} \text{ hr.}$$

Time taken by train is $1 \frac{1}{6}$ hours.

therefore train will arrive
around 5:20 pm.

PART (D,)

(i) Superintendent.

(ii) White.

QUESTION NO: 08

PART-A:

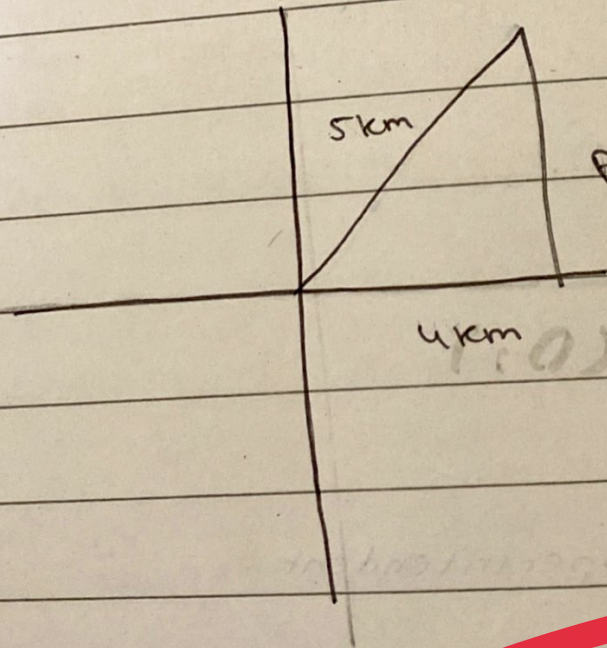
A man travels a path of right angle triangle in the following way.

Travelling along base = 4 km

Travelling along hypotenuse = 5 km

Continuation in same direction = 8 km

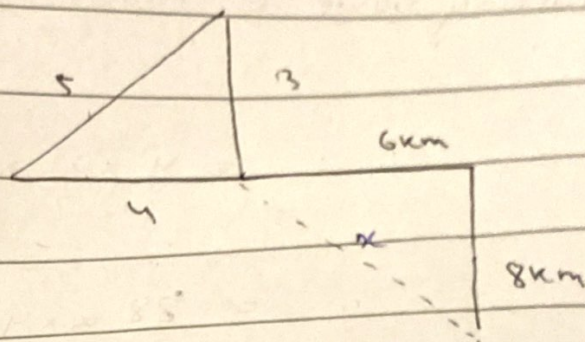
Travel after turning $90^\circ = 8$ km



$$\text{Hypotenuse}^2 = \text{Base}^2 + \text{Height}^2$$

$$\text{Height}^2 = \text{Hypotenuse}^2 - \text{Base}^2$$

$$\begin{aligned}\sqrt{H^2} &= \sqrt{H^2 - \text{Base}^2} \\ &= \sqrt{25 - 16} \\ &= \sqrt{9} \\ &= 3 \text{ (Height)}\end{aligned}$$



Using the formula

$$H^2 = B^2 + P^2$$

$$x^2 = 6^2 + 8^2$$

$$\sqrt{x^2} = \sqrt{6^2 + 8^2}$$

$$x = \sqrt{36 + 64}$$

$$= \sqrt{100} = 10 \text{ km}$$

$$\text{Total distance} = 3 + 5 + 4 + 6 + 8 = 26 \text{ km}$$

He has travelled around 26 km

and is 10 km away from starting point

PART (C):

Radius of sphere = 7m.

$$\text{Volume of sphere} = \frac{4}{3} \times \pi \times r^3$$

Putting value of radius.

$$= \frac{4}{3} \times \frac{22}{7} \times (7)^3$$

$$= \frac{88}{3} \times 49$$

$$= 1437.3 \text{ m}^3$$

$$\text{Area of sphere} = 4 \times \pi \times r^2$$

$$= 4 \times \frac{22}{7} \times (7)^2$$

$$= 616 \text{ m}^2$$

Therefore, volume of sphere is 1437.3 m³ and area is 616 m².

PART (D):

— | — | — | 30

Total amount for distributions

Rs 4320.

Distribution in following parts

$$\text{Zain} = 2x$$

$$\text{Aslam} = 3x$$

$$\text{Ashraf} = 7x$$

$$2x + 3x + 7x = 4320.$$

$$12x = 4320$$

$$x = \frac{4320}{12}$$

$$= 360.$$

$$= 360.$$

Putting value of x

$$\text{Zain} = 2x$$

$$= 2 \times 360$$

$$= 720 \text{ rupees}$$

$$\text{Aslam} = 3x$$

$$= 3(360)$$

$$= 1080 \text{ rupees}$$

$$\text{Ashraf} = 7x$$

$$= 7(360)$$

$$= 2520 \text{ rupees}$$

Hence the distribution of money should be in such a way

that Zain gets 720 rupees

Aslam 1080 and Ashraf 2520 rupees.