

Dos and Don'ts for the General Science & Ability Paper
Hi there — you've prepared well! Remember, knowing the content is one thing, but presenting it in the paper exactly as required is another. Here are a few key points to keep in mind:

Part II

SECTION - I

1. For a 5-mark part, aim to write at least 2 and at most 3 sides of the answer sheet. Often, a question has two or three parts, and the marks are divided accordingly — so address each part fairly.
2. Manage your time wisely — you have about 35 minutes per full question, which comes down to around 8 minutes for each 5-mark part. Stick to this to avoid rushing later.
3. Make your answers look scientific, not just theoretical. Use flowcharts and diagrams wherever they add clarity.
4. Neatness matters — keep your handwriting clean, avoid cutting or overwriting.
5. Mind your spelling and grammar — while GSA doesn't deduct marks for these, your expression leaves an impression.
6. In the ability portion, explain analytical ability questions in words. For a 5-mark part, show all steps and provide clear explanations.

Importance of Data

Here's a brief key/sample of your Ability questions

Q.6

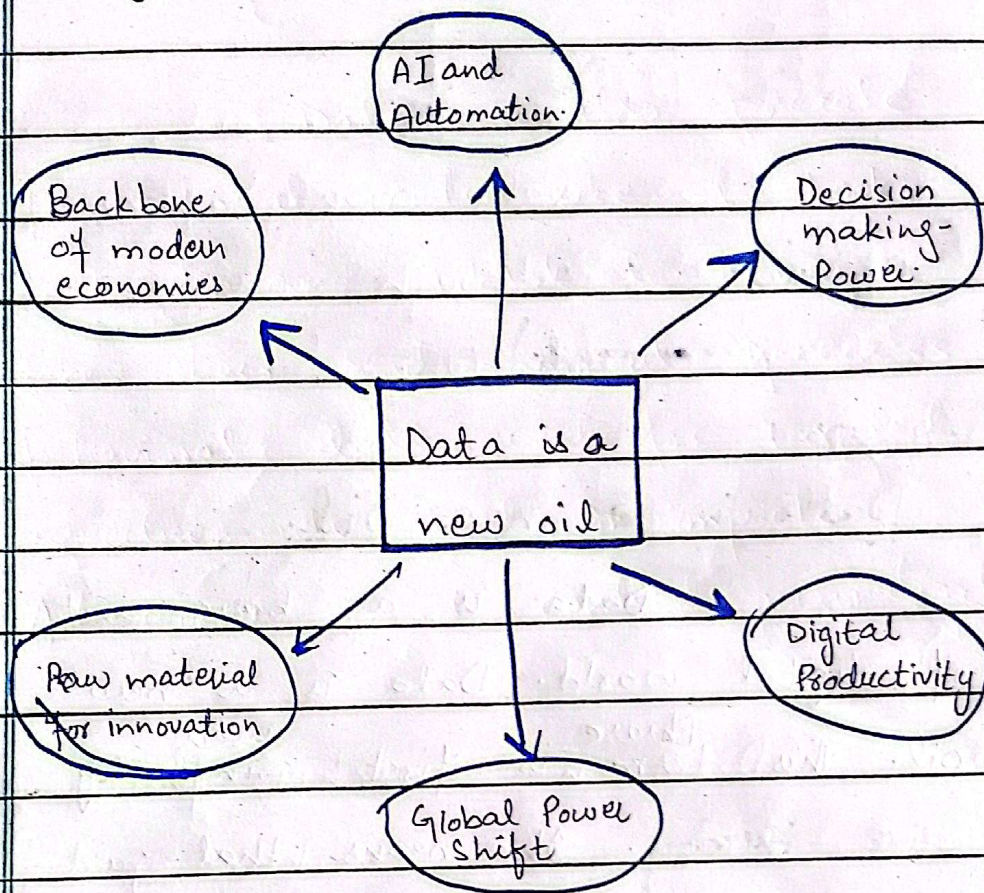
a) Candy ratio problem

Given: Packets in flavors Apple : Berry : Cherry : Date = 3 : 6 : 2 : 5.

Asked: If Apple candies exceed Date candies by 35, how many Berry candies are there?

Note (consistency check): The ratio shows Apple = 3 parts

Why data is a new oil?



1- Data is a backbone of modern economies:

E-commerce, fintech and online dealing based on data

2- AI and Automation are impossible without data:

Data fuels machine learning, enabling self-driving cars, medical diagnosis and smart cities

3- Data is a raw material for innovation.

Like crude oil, raw data gains value only after refinement - through analysis and interpretation.

Examples:

1- Online Shopping:

Data on searches, purchases and liking and dislikes helps the products and seller about the customer demand about relevant products and manage ~~at~~ inventory efficiently.

2- Banking and Financial Services

Banks analyze transaction data for fraud detection and illegal activities and terror financing.

Thus, it improve their services and provide safer transaction

better risk management.

-3- Social Media:

Data is also generated from social media like Facebook, Instagram and TikTok etc. Every like, share and comment generates behavioral data used for targeted advertisements and ~~to~~ impact Ad revenue and content personalization.

———— (b) ————

Answer:

Expansion of Universe

The concept of expanding universe is a central idea in a modern cosmology. It means that galaxies are moving away from each other as space itself stretches. Scientists compare this process to a balloon being inflated, which helps us imagine

how universe growing in size
without having center or an
edge.

Hubble's Law:

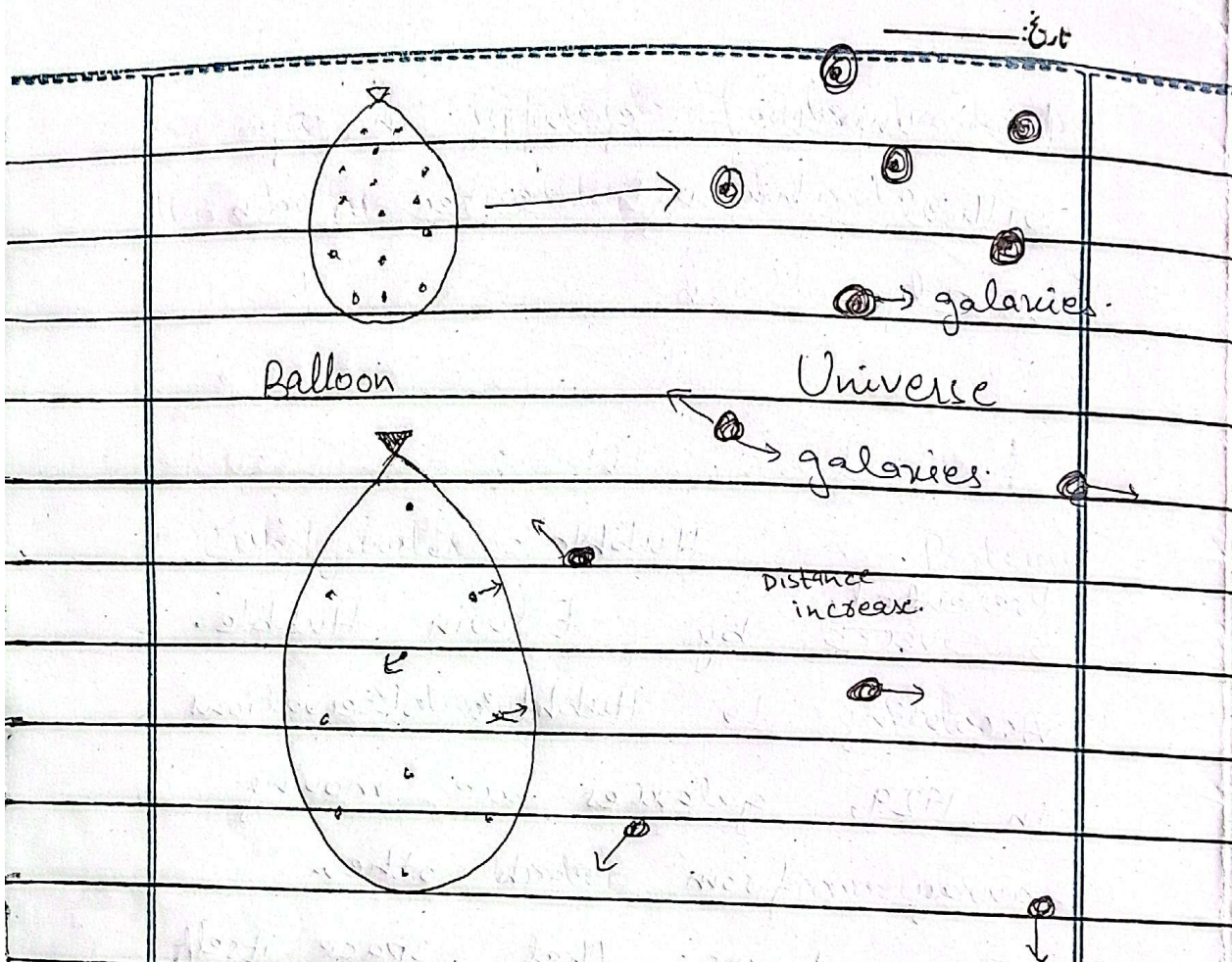
Hubble's Law is
presented ~~discovered~~ by Edwin Hubble.

According to Hubble's observations
in 1929, galaxies are moving
away from each other.

This shows that space itself
is expanding, not that galaxies
are moving through space. The
universe is stretching in all
direction uniformly, just like
the surface of an inflating
balloon.

Uses Balloon Analogy to explain Universe expanding:

balloon with small
dots on its surface. Each dot
represent a galaxy.



As the balloon inflates, the surface area expands, similar to how the space expands. Each dot moves away from all other dots, even the dots themselves don't move over the balloon's surface. The further the two dots are, the faster they move away from each other, exactly like the galaxies in our universe. There is no single

or

centre point - expansion happen everywhere. The air inside the balloon represent the stretching of space itself. This shows that the universe has no center of expansion, space is expanding in all directions at once.

Answer:

Balanced Diet:

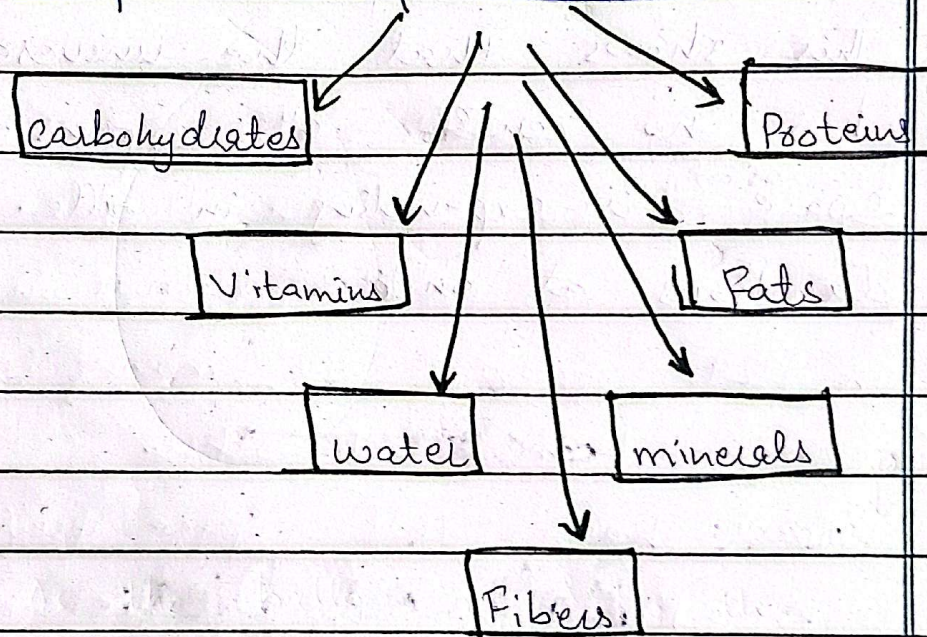
What is Balanced Diet?

A balanced diet is a diet that provides all the essential nutrient in correct properties required by the body for growth, energy, repairs and maintenance.

In simple words, a balanced diet means eating the right

amounts of different foods to keep the body healthy and active.

Components of balanced diet:



Imbalance Due to Vitamin's Deficiency:

1- Vitamin - A

Source: Carrots, Spanish, milk
fish oil, eggs.

Function: maintains healthy
eyes, skin and immune
system.

Deficiency Disease:

Night Blindness:

Night Blindness means difficulty seeing in dim light and in night.

Other effects:

Dry eyes, tough skin, weak immunity.

Vitamin-D:

Source: Sunlight, egg,

fish, milk, Dry fruit.

Function: Help in calcium absorption, bone formation and strong teeth.

Deficiency Disease:

Rickets

Osteomalacia

Rickets: → Common in children, related to soft, bent bones.

— 60 —

Osteomalacia: Common in adults,
related to weak bones and
muscle pain

Other Effects: Fatigue, bone pain,
dental issues.

Vitamin - E:



Source: Nuts, vegetable oils,
green leafy vegetables,
seeds.

Functions: Acts as an
antioxidant, protect cells
and tissues.

Deficiency: Muscle weakness,
Vision problems, nerve damage,
weakened immune system.

— a d b —

Working of GPS and optic
fiber:

Global Positioning System: (GPS)

GPS help to determine the exact location of an objects time and speed on Earth.

Working of GPS:

Component of GPS:

Satellites

Ground station

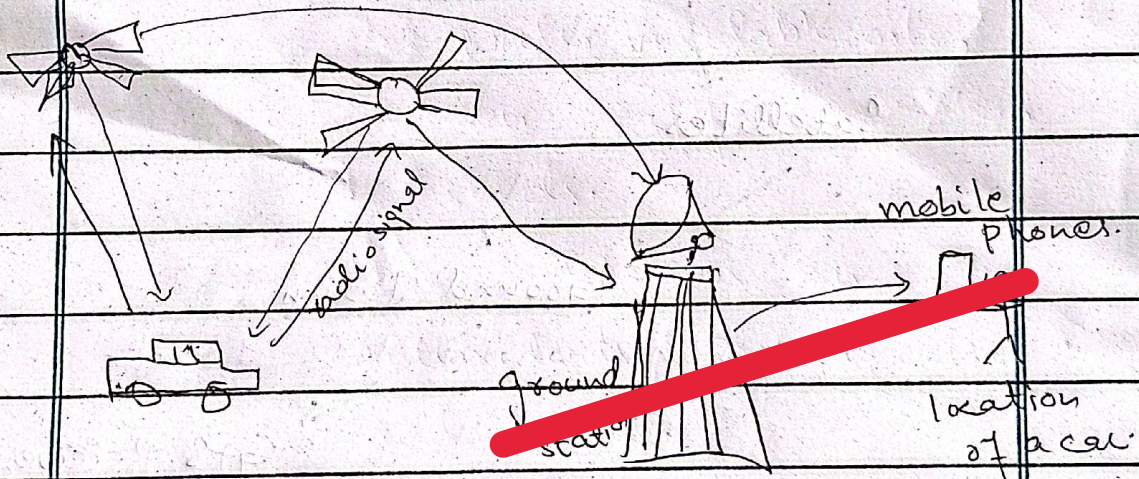
GPS Receiver.

Working Principles:

Each satellites send radio signals. That radio signals from differen satellites ~~se~~ reflect back to object and recieve by the satellites which use a method of

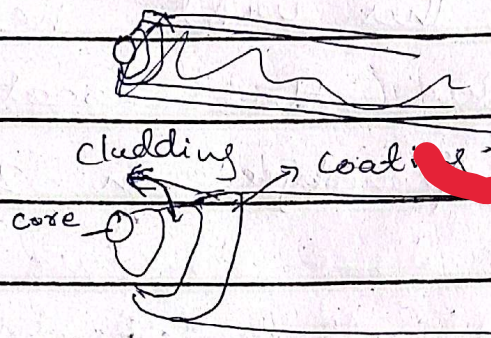
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trilateration and calculate, distance from each satellites and time. Then satellite send these signals to ground station where these station provide information to the user in their mobile phones and other receivers.

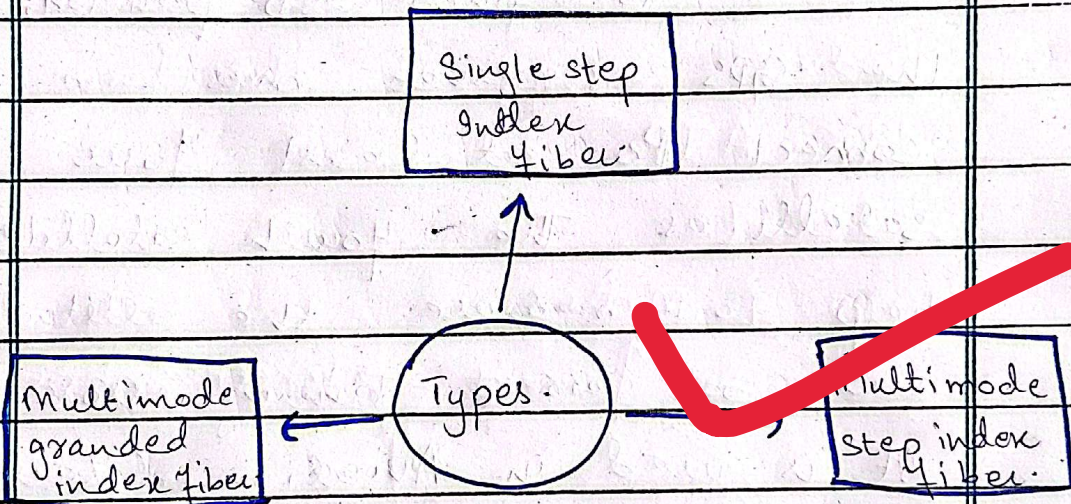


Optical Fiber:

① Optical fiber is a thin, flexible strand of a glass or plastic that transmits data as light signals instead of electrical signal.



Type of optical fibers:



Measurement of 2D and 3D locations by satellites:

2D location: (Latitude & Longitude):

To find the 2D location of an object, the GPS receiver

must connect to at least three satellites. This will help to measure the location/position of object in 2D dimension.

3D Location (Latitude, Longitude, Altitude).

To find 3D position, the GPS receiver must connect to at least four satellites. The fourth satellite help to measure the altitude and ~~so~~ correct timing errors. It is used in Aviation, defense and navigation.

Question - 03

Cell & Mitochondria

Cell:

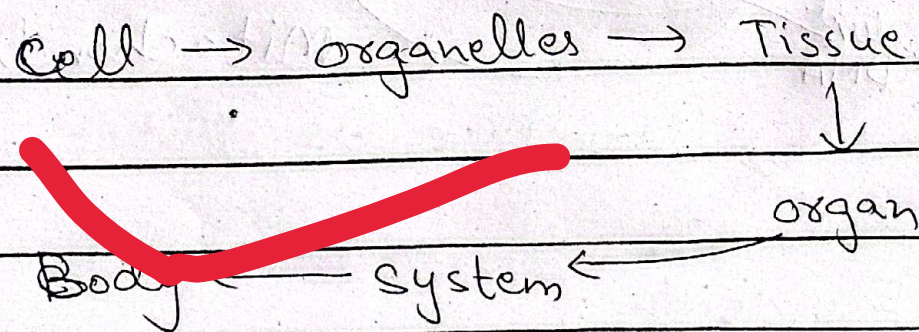
Cell is the basic structural

and functional unit of life.

Why cells form Organelles:

~~Cells~~ Different cells combine together to form organelles. Cells form organelles to divide the work and increase efficiency. Each organelle perform different function - just like the departments ~~of~~ in a company.

Cell is a single unit and it cannot perform any function and don't make body.

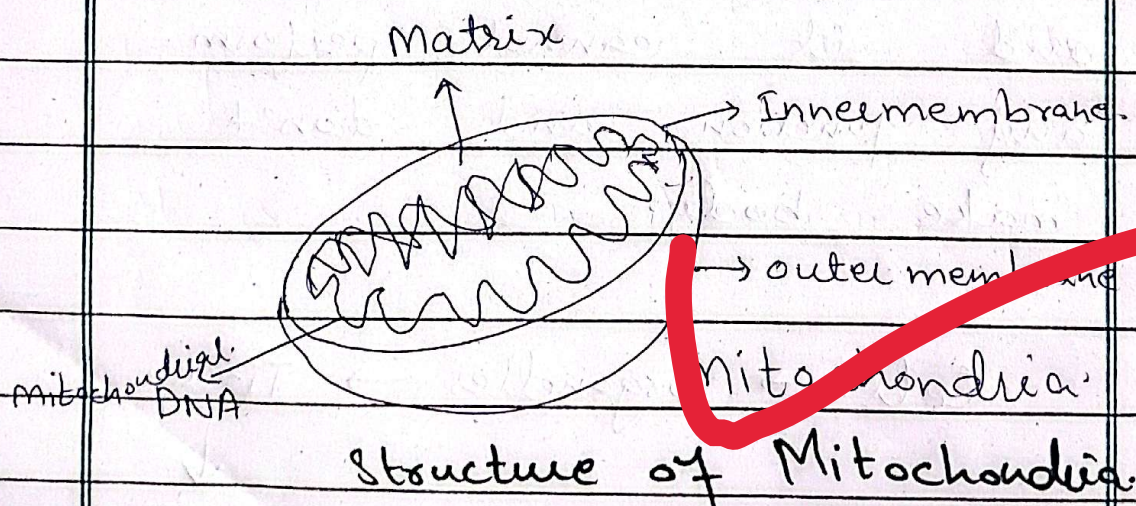


Mitochondria in human cells:

Definition:

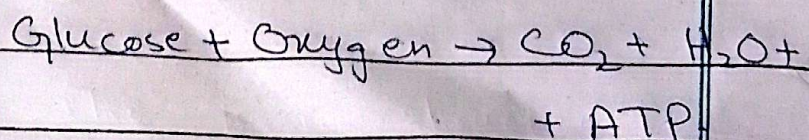
Mitochondria are double membrane ~~store~~ structure found in almost all human cells.

They are known as "powerhouse of the cell" because they produce energy in the form of ATP.



Functions:

1- Energy Production:



2- Cellular Respiration.

3- Heat Production.

4- Calcium Storage.

~~(b)~~

Doping & Semiconductors:

Doping:

Definition:

Doping is a process of adding a small amount of impurity to a pure semiconductor to increase its electrical conductivity.

The impurity are usually group III or group V element.

Purpose:

Doping changes the number of free charge carriers in a semiconductor, making it more useful for electronic devices.

Types of Semiconductors:

N-Type

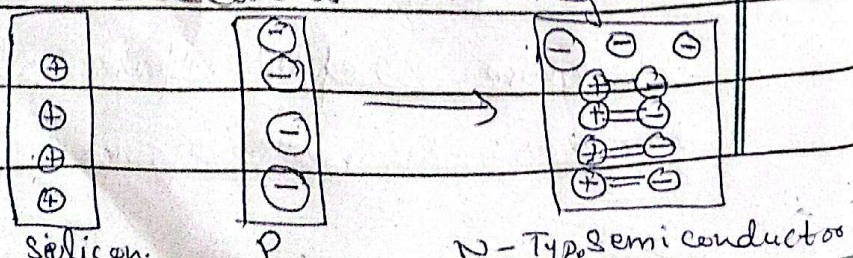
P-Type

a- N-Type Semiconductor:

A N-type semiconductor is formed when a pentavalent impurity (5-valence electrons) such as Phosphorus etc is added to pure silicon or germanium.

Working: Four out of five electron make covalent ~~etc~~ bond with silicon and fifth electron become free and move through the crystal and act as a charge carriers.

The "N" stands for negative because electrons are negative.



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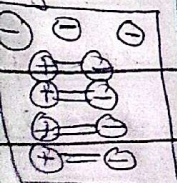
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Type semiconductor

b- P-Type Semiconductor:

P-Type is formed when a bivalent impurity (3 valence electrons) such as Boron (B), Gallium (Ga) or Indium (In) is added to pure silicon or germanium.

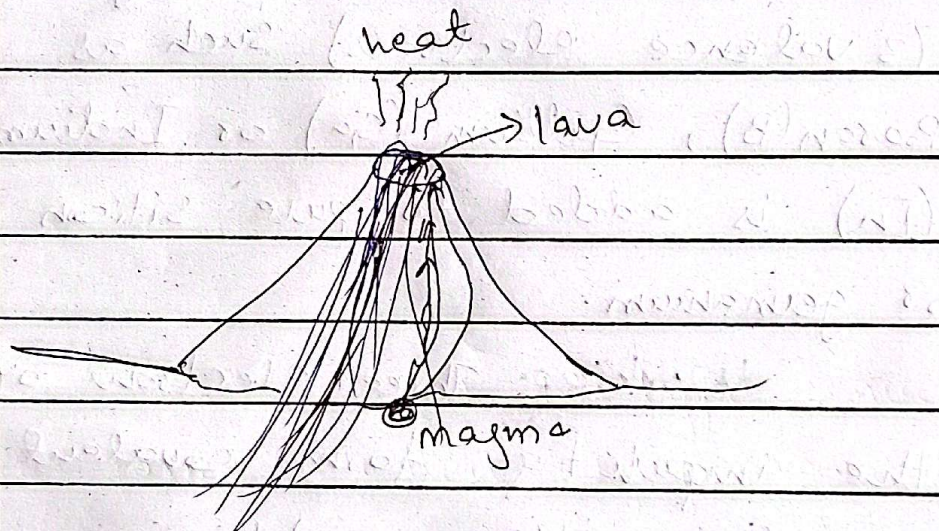
Working: Three electrons of the impurity form covalent bonds with neighbouring silicon atoms while one bond remains incomplete and form hole. These holes act as positive charge carriers.

(c) Merits and Demerits of Volcanic eruption:

Definition of volcanic eruption:

A volcanic eruption occurs when magma flows beneath.

the earth's crust rises to the surface, releasing lava, ash, gases and rocks.



Merits of Volcanic eruption:

- 1- Volcanic ash and lava contain minerals like potassium, calcium, and magnesium, which enrich the soil fertility.
- 2- Heat from volcanic activity is used to produce geothermal electricity.
- 3- Volcanoes bring valuable minerals such as copper, gold, silver, and diamond.

from deep inside the earth.

4- It is also used.

for scientific study and
Research.

Demerits of volcanic eruption:

- 1- Lava flows, ash clouds,
poisonous gases destroy
cities and villages; e.g.
in 2018 eruption from
Mount Kilaua (Hawaii) caused
heavy destruction.
- 2- It also produce poisonous
gases and cause Air
pollution and respiratory
diseases.
- 3- It leads to displacement
of large number of
population.

Dengue:

Denge is a viral disease transmitted to human through the bite of an infected female Aedes mosquito. mainly Aedes ~~egypti~~.

Symptoms:

High fever
Severe headache,
Pain behind eyes.
Joint & muscles pain
Nausea, vomiting,
Skin rashes and
mild bleeding.

Causative agent:

Dengue virus (DENV) is the causative agent belongs to Flavivirus family.

Remedies & Treatment:

1- Medical care:

Paracetamol (Panadol)

Hospitalization

Hydration.

In severe cases: Blood transfusion is required.

2- Home Remedies:

- Papaya and its leaf extract
- Coconut water
- rest

SECTION-II

Question- 06:

Given Data:

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

Apple candies exceed date candies
by 35.

Find Berry candies.

Solution:

$$\text{Apple candies} = 3x$$

$$\text{Date candies} = 5x$$

Apple ^{candies} exceed date candies

$$5x = 3x + 35$$

$$3x = 5x - 35$$

$$3x + 35 = 5x$$

$$5x - 3x = 35$$

$$2x = 35$$

$$x = \frac{35}{2} = 17.5$$

$$x = 17.5$$

$$x = 17.5$$

Find Berry candies.

$$\text{Berry candies} = 6x$$

$$6x = 6(17.5)$$

$$105$$

Berry candies are 105.

Given Data:

Price of Camera = \$200

Discount = 20%

tax = 6%

Find:

Total amount paid.

Solution:

First calculate 25% discount
of \$200

$$25\% \text{ Discount} = \frac{25}{100} \times 200 = 50$$

\$50 off

Price after discount:

$$\$200 - \$50 = \$150$$

6% tax on ^{after} discount

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

Total amount paid.

$$\$150 + \$6 = \$156$$

Total amount paid = \$156

85

Q(c)

Given Data:

Distance covered by bicycle = 36 km

speed = 18 km/h

Time of starting travel = 1 pm

Find.

time to reach at destination = ?

Solution:

Formula:

$$\text{Time} = \frac{\text{Distance}}{\text{speed}}$$

$$\text{Time} = \frac{36 \text{ km}}{18 \text{ km/h}}$$

$$\text{Time} = 2 \text{ hr.}$$

The starting time = 1 pm.

$$1 \text{ pm} + 2 \text{ hr} = 3 \text{ pm.}$$

bicycle reach at 3 pm.

Q(d)

i- Statistics-

ii- Algebra.

Question - 7

~~Q. 7~~

Given Data:

Diameter = 14 cm

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

$$\text{Use } \pi = 22$$

Find:

Volume of a sphere.

Solution:

Formula -

$$V = \frac{4}{3} \pi r^3$$

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

$$V = \frac{4}{3} \times 22 \times \frac{343}{1}$$

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

$$V = \frac{4}{3} \times 359.33$$

$$V = 479.11$$

$$V_2 = 14 \times 359.33$$

$$V_2 = 14 \times 37.32 \text{ cm}^3$$

~~Q. 6.3~~

Given Data.

Total saving = Rs 25000

Five friend ratio = 1 : 2 : 3 : 4 : 5

Find

Find smallest share

Solution:

$$A : B : C : D : E$$

$$1 : 2 : 3 : 4 : 5$$

Sum of ratio = $1 + 2 + 3 + 4 + 5$

$$= 15$$

$$\text{Find A share} = \frac{1}{15} \times \frac{1666.66}{5000} \times 25000$$

$$\text{A share} = \frac{15}{15} \times 1666.66$$

$$\text{B share} = \frac{2}{15} \times 25000 \times 1666.66$$

$$18$$

$$2 \times 1666.66$$

$$\text{B share} = 3333.33$$

$$C \text{ friend share} = \frac{1}{3} = 1666.66$$

$$= \frac{1}{3} \times \frac{5000}{25000} = \frac{1}{3} \times \frac{1}{5} = \frac{1}{15}$$

$$C's \text{ share} = 5000$$

$$D's \text{ share} = \frac{4}{15} \times 1666.66$$

$$D's \text{ share} = 666.66$$

$$E's \text{ share} = \frac{5}{15} \times 1666.66 = 833.33$$

The smallest share is friend A which is 1666.66.

Q.C.B

Complete the series.

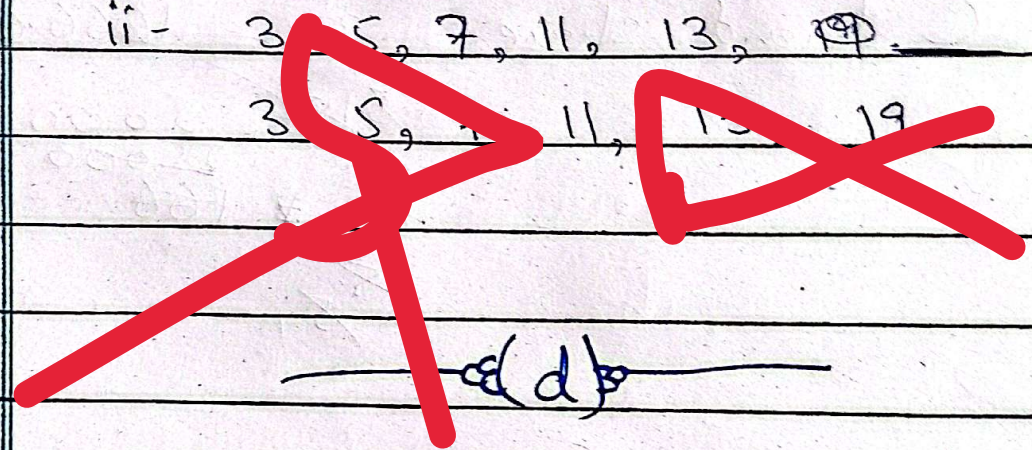
$$i - 2, 6, 18, 54, 162, 486$$

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

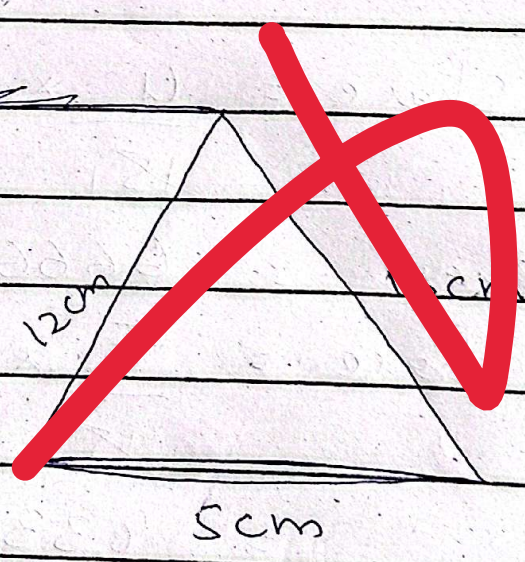
Ans No error.

ii - 3, 5, 7, 11, 13, 17

3, 5, 7, 11, 13, 19



~~ed d~~



Find all three angles.