

Section II

(Q#8)

(a)

Given:

Road = UQDG

Required:

Code of 'LAKE'

Sol:

ROAD
 $\begin{matrix} 18 & 15 & 1 & 14 \\ +3 & +2 & +1 & +3 \\ \hline 21 & 17 & 2 & 17 \end{matrix}$
 UQDG

so

LAKE
 $\begin{matrix} \downarrow & \downarrow & \downarrow & \downarrow \\ OCNG \end{matrix}$

OCNG

Explanation:

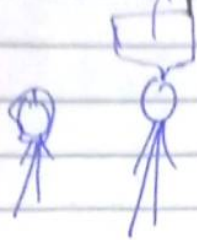
Here the 1st letter is increased by 3 & the 2nd by 2 & goes on.

~~(8(b))~~

Son of my sister's husband



Father of your son.



man $\rightarrow A$

A's sister = B $\rightarrow$ husband C

$A \rightarrow B$

$B \rightarrow C$



D = father of your son
(woman's husband).

Women is Daughter-in-law
of the man.
(Nephew's wife).

~~(C)~~

Sequences

④ 4, 12, 6, 18, 9, 27, —
8 6 12 9 18

4, 12, 6, 18, 9, 27, 53
13.5

13.5

$n = 26 \neq 27$
 $n = 27 \neq 26$
53

7
27
9
18
8, 12, 18
18
27
9
6
8, 9
13
27
9
8, 12, 18, 26
13
2

~~(c)~~

11) 1, 2, 6, 24, 120, —

1, 2, 6, 24, 120, 720
 $\begin{matrix} 1 \nearrow & 2 \nearrow & 6 \nearrow & 24 \nearrow & 120 \nearrow & 720 \\ x_2 & x_3 & x_4 & x_5 & x_6 \end{matrix}$

$24 \overline{) 120}$

$\begin{array}{r} 24 \\ 5 \\ \hline 120 \end{array}$

$$120 \times 6 = 720$$

Explanation:

Started from 1
 & every # is multiplied
 by 2; then 3, then 4 &
 onward.

$$1 \times 2 = 2$$

$$2 \times 3 = 6$$

$$6 \times 4 = 24$$

$$24 \times 5 = 120$$

$$120 \times 6 = 720$$

~~(d)~~

P, Q, R, S, T $\rightarrow$ diff heights

⊙ R P Q

⊙ Q S T

⊙ shortest = 150cm

Tallest = 180cm

3rd tallest = ?

Possible range of each height = ?

(4)

Q #

Height of all

R P Q S T

Height of R = 150 cm

Height of T = 180 cm

3rd tallest is Q

Maximum possible

$$\text{range} = 180 - 150 = 30$$

~~(Q # 7)~~

~~(d)~~

Let son's age = S

Father age = F

$$4(S - 10) = (F - 10)$$

$$4S - 40 = F - 10 \quad \text{--- (1)}$$

$$S + F = 75 \quad \text{--- (2)}$$

$$S + F = 75$$

Current ages = ?

$$4S - 40 = F - 10 \quad \text{--- (i)}$$

$$S + F = 75 \quad \text{--- (ii)}$$

$$4S - F = -10 + 40$$

$$4S - F = 30 \quad \text{--- (iii)}$$

$$S + F = 75 \quad \text{--- (ii)}$$

$$5S = 105$$

$$S = \frac{105}{5} = 21$$

$$S = 21$$

$$S + F = 75 \rightarrow 21 + F = 75$$

$$F = 75 - 21$$

$$F = 54$$

$$F = 54$$

Present ages of Son &

Father are 21 &

54 respectively

~~Q (a)~~

$$\text{Total} = 100$$

watches: Cricket = 65

Hockey = 40

Nothing = 20

8

$$100 - 20 = 80$$

$$80 \rightarrow 65 \rightarrow \text{Cricket}$$

$$\rightarrow 40 \rightarrow \text{Hockey}$$

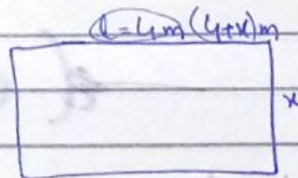
$$65 + 40 = 105 \rightarrow \text{(the watches are)}$$

105 watches Cricket & Hockey.

$$105 - 80 = 25$$

25 among 100
watches both

~~a (b)~~



let width = x

length = $4+x$

$$\text{Perimeter} = 72\text{m}$$

V of water needed

to fill it depth of 2.5m.

$$\text{As perimeter} = 2(l+w).$$

$$P = 2(l+w)$$

$$72 = 2(4+x) + x$$

$$72 = 2(4+x+x)$$

$$72 = 2(4 + 2x)$$

$$72 = 8 + 4x$$

$$4x = 72 - 8$$

$$x = \frac{64}{4}$$

$$x = 16 \text{ m}$$

$$\text{width} = 16 \text{ m}$$

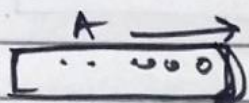
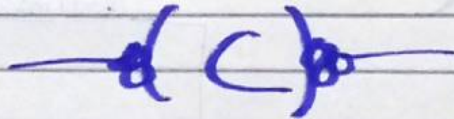
$$\text{length} = 4 + 16 = 20 \text{ m}$$

$$V = 16 \times 20 \times 2.5$$

$$V = 800 \text{ m}^3$$

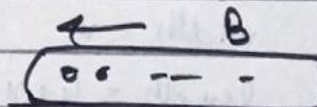
$$V = 800 \text{ m}^3$$

$$\begin{array}{r} 16 \\ \times 25 \\ \hline 80 \\ 400 \\ \hline 400 \end{array}$$



8:00 AM

60 km/hr



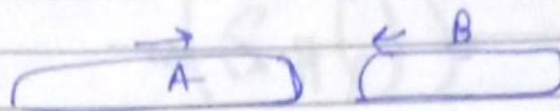
8:00 AM

40 km/hr

Distance b/w A & B = 400 km.

8

As both move towards each other.



Relative speed is added in this case.

$$60 \text{ km/hr} + 40 \text{ km/hr}$$

$$V = 100 \text{ km/hr}$$

As $V = \frac{\text{distance}}{\text{time}}$

$$\text{time} = \frac{\text{distance}}{\text{speed}} = \frac{400}{100} = 4 \text{ hr}$$

Started at 8:00.

$$\begin{array}{r} +4 \\ \hline 12:00 \end{array}$$

Both will meet
at 12:00 noon
12pm

Section I

(Q#2)

(a)

Star

Part of solar system which constitute the the center. All other particles revolve around it.

Example = Sun

They have their own energy & are luminous.

Revolve around black hole

Temperature is great due to exothermic reaction

Planets

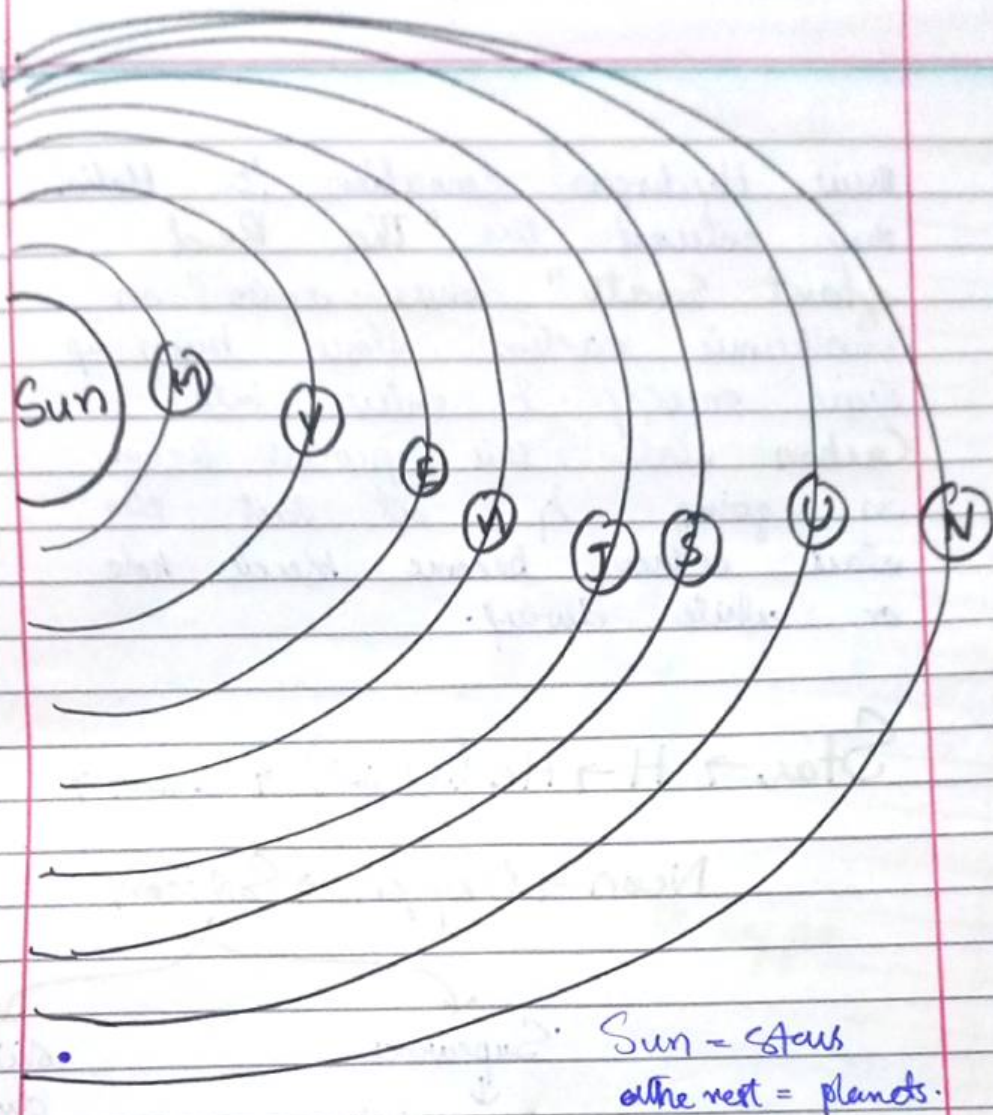
Part of solar system which revolve around the star.

Example = All 8 planets of our solar system

They are non-luminous objects.

Revolve around star

Temperature of diff planets is diff, earth's temperature is suitable for life among all.



Life cycle of Stars:

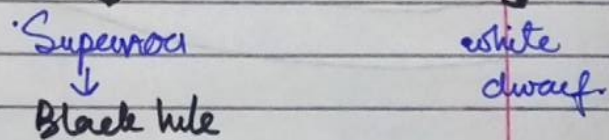
Life cycle of stars begin at Nebula & ends up either at black hole or at white dwarf.

Stars have constant exothermic reaction which produce heat and light, but this process doesn't last forever. After a time when the stars finish up

their Hydrogen conversion to Helium they entered the "The Red giant State" where again an exothermic reaction starts burning up their energy & enter into Carbon state, this process keeps on going & at last the stars either become black hole or white dwarf.

Star $\rightarrow$ H $\rightarrow$ He (Red giant) $\rightarrow$ Carbon $\rightarrow$

Neon $\rightarrow$ Oxygen $\rightarrow$ Silicon



When a star burns up all its ingredients it convert to supernova (only the big stars), it is a type of black hole which attract all debris of space to its center. The supernova is formed when star size ~~goes on~~ increasing as it move from H $\rightarrow$ Silicon & at ~~the~~ last must end form supernova which is actually a black hole.

(b)

Semiconductor:

"The materials whose conductivity is between conductor & insulators are semiconductor."

Such materials partially allow the conduction of heat & electricity & therefore are widely used in for many projects worldwide.

N-type

The type of SC where numbers of electron are higher

Pentavalent atoms form such type
Phosphorous, Arsenic

One electron is excess

Majority charge carrier = electron

Minority is hole

P-type

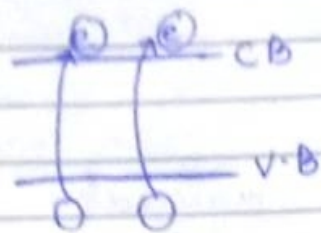
The type of SC where numbers of electron are lower.

Formed by Trivalent atoms.
Boron, Al

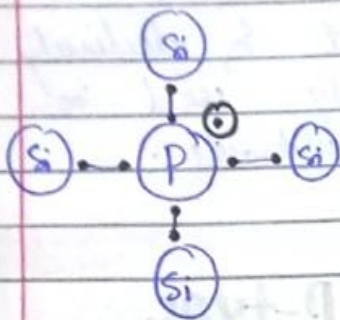
One electron is deficient here

Majority charge carrier is hole.

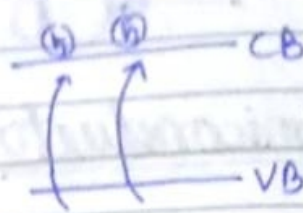
Minority is electron



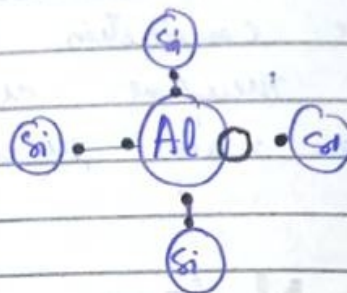
Electron donors



One extra electron



Electron acceptor



One electron needed

Modern Application:

① Solar cells:

Solar cells

uses p-n junction & convert sun-light into electricity.

solar farms

calculators

solar panels

① ICs:

Integrated circuits use billions of p-type & n-type transistors to make the modern electronic devices like:

Computers

phone

Smart watches

— (C) —

Global warming:

"the phenomena in which earth temperature rises from its normal one is termed as global warming."

Mechanism of
Green house effect:

"Sunlight is trapped inside the earth atmosphere due to certain gases this phenomena is known as GHE."

Farmers use the mechanism of GHE in order to trap more heat & light of sun for better photosynthesis. For this

They instal a glass panel above their crops, the sun light when enter this panel ~~are~~ is trapped inside as its wavelength decreases & then it become hard for such waves to exit. This phenomena created by ~~that~~ human help plants to absorb more light & so ~~the~~ the crop yield can be increased in such way. ~~Alaska~~ have bigger (giant) size fruits & vegetables b/c there the sunlight is for ~~upto~~ for 20 hours a day which help farmers to grow more and even bigger crops than ordinary. But again anything "Everything that is in excess become destruction rather than a benefit." Same is the case in GHGs when such gases increases they trap more heat & light than necessary & ultimately results in global warming.

Major GHG:

(i) CO_2

(ii) CH_4

(iii) NO

(18)
CO₂ is caused by fuel
combustion, respiration.

Methane is caused produced naturally
in earth pockets & also
by cattle.

Nitrous Oxide is produced due
to industrial process.

~~and d/o~~

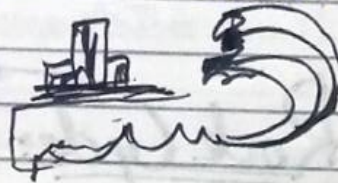
Tsunami:

It is coined from
two Japanese words;

Tsu → harbor

Nami → waves

"Tsunami is the destructive
waves arise in ocean which when
comes to shore produced immense
destruction."



Natural processes that trigger it:

- (i) The tectonic plate
movement causes the water
of the ocean to displace
with pressure & eventually ~~can~~
become the reason of its production.
- (ii) The land slides or the break
down of mountains also triggers

- the process.
- (a) Volcanic activities can also trigger its production

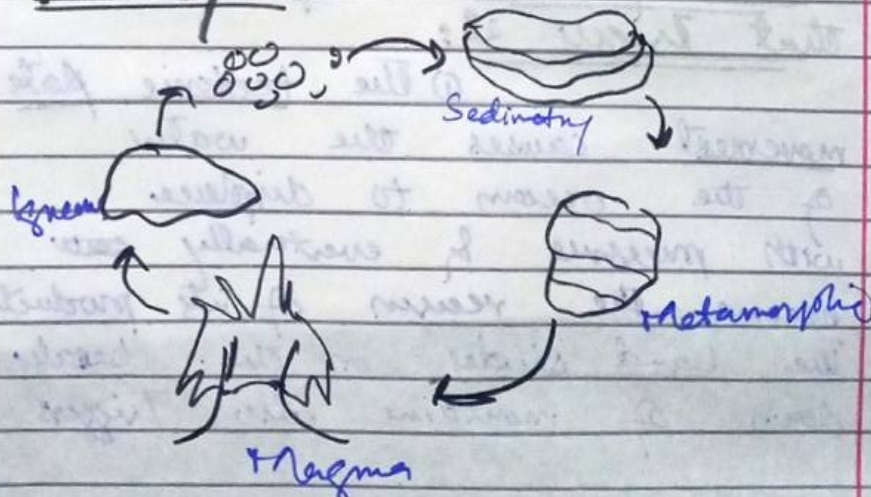
Potential Impacts on Coastal areas:

It can cause destruction of coastal areas

- (i) Loss of life & injuries
- (ii) Destruction of infrastructure
- (iii) Environmental & economical losses
- (iv) Flooding & land erosion
- (v) Populations are displaced

~~(Q#4)~~

Rock Cycle:



(8)

Magma is molten form of rock which on cooling become igneous rock, after weathering igneous rocks are converted into sediments which on cementation become sedimentary rocks, when heat & pressure is applied on sedimentary they convert to metamorphic & on melting to Magma.

Igneous Rocks:

Hard, crystalline rocks formed by solidification of molten lava.

eg: Granite, Basalt.

Sedimentary Rocks:

Layered rocks formed by the cementation of sediments.

eg: Limestone.

Metamorphic:

Type of rock formed by heat & pressure applied on existing rock.

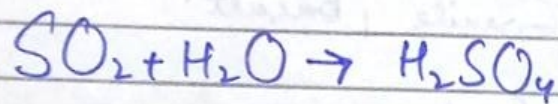
eg: Marble, Slate.

Acid rain:

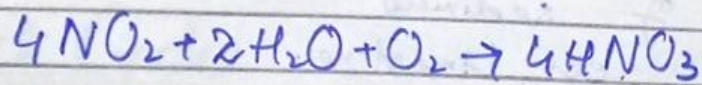
"When oxides of Sulphur & Nitrogen combine with other gases of the atmosphere they form sulphuric & nitric acids which results in acid rain."

Chemical rxn:

⇒ Combustion → SO_2 which combine with H_2O in atmosphere as:



⇒ Vehicles → NO_2



Impacts:

- ① It lowers PH which causes death of fishes & other aquatic species.
- ② Releases toxic metals & disrupts the food cycle.

- ① leaves are damaged, growth is affected, plants diseases & small yield of crops are the major impacts of acid rain in vegetation.

~~dip~~

Solid Waste management

"The collection, transportation, processing & recycling of solid waste is known as SWM."

Environmental hazard associated with urban waste.

The environmental hazards are air, water & soil pollution which affect health, biodiversity & environmental problems along all these it also poses produces the drainage problems.

~~(C)~~

Remote sensing

the process of collecting information from different sources without direct physical contact is known as RS.

GIS

Geographic Information System

"It is a computer-based system to store, collect & analyse the geographical data of any location."

Monitoring & Disaster

management:

- ① Remote sensing provide real time data about earth's surface so can be used for flood management, storm early tracking & earth quake assessment.
- ② GIS is used for Risk mapping, early warning, & evacuation planning before its too late.