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Part II

Section 1

QNO4

(a)

Flood:→ In any drey land, if over flow of water occurs that it is said to be floods these Floods are resulting from heavy rainfall, rapid snowmelt, dam failure and cause other disruptions to the natural flow of the water.

Main causes of flood

1) **Heavy Rainfall:-** River systems and drainage capacities were being affected by heavy rainfall. which cause serious distruction.

2) **Snow melt:-** Due to global warming and continuously changing of weather patterns changing, there is the excessive melting of snow from the glaciers, and this water flow increase in rivers and strems.

3) **Storm surges:** Coastal areas are very affected to the storm surges which are associated with hurricans and typhoons. and resulting heaving flooding in these areas.

4) **Dam Failure:-** This is not the type of natural flooding. It occur due to sudden damage of dam and can cause sudden severe flooding.

5) **Deforestation:-** Deforestation reduce the land's ability to absorb the rain water and that's why risk of flood increase.

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Difference between Floods of 2022 and super flood of 2010

Flood of 2022: The flood of 2022 were majorly the consequences of several reasons. The reasons were ~~unusual~~ unusual rainfall paterns, extreme weather conditions and other Local issues. In some areas, climate change played major role. It intensified the frequency of flooding. But in Flood 2022, Their impacts and significance were majorly based upon the preparation and the infrastructure of the region.

Flood 2010: The flood of 2010, especially in Pakistan was called the super flood. Because of excessive moonsoon rainfall and river overflow and inefficient drainage system caused the major outbreak of flood and local and Federal level authority were unable of handle these kinds of disasters and in a result we withnessed major flooding.

Role of National Disaster Management Authority (NDMA)

NDMA has the significant role in manging the dicaster risks and responding to the emergencies. There are multiple wayes, where they can manage- Preparation and planning, Resource management, coordination between Local and provincial government authorities, Training and Awareness campaigns.

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(b) Differentiation Between stars and Planets

1) Nature and composition

- **Stars:** Stars like the sun and others which produce their own energy. Stars are the massive celesial bodies and they generate heat through nuclear fusion reaction where hydrogen atoms combine with helium and form multiple other atom within the nanoseconds and these reactions, releasing tremendous amount of energy.
- **Planets:** Planets are composed of different material like gases, ~~stars~~, rocks and ice etc. Planets revolve arount the stars - the bodies which orbit stars. and planets donot produce their own energy. They reflect the light from their stars.

2) Size and Mass

Stars are generally more massive than the planetets. that of the sun. Their masses are typically more than the planets like Sun mass is more than the earth and their diameter are also more Larger like in thousand times than of the earth. on the other hand planets are smaller in size and also in mass and diameter. They range from 1000 to 10,000 ~~from~~ of kilometer in diameter.

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3) life cycle:-

Stars: Stars goes through the lifecycle and pass from various stages like main sequence, red giant and ultimatelly end with white draft or Black hole and it depends on their mass.

Planets: Planets donot go through the phases like the stars. They donot have the lifecycle similar to the stars. Their change only occur due to internal and external forces.

How a star becomes a black hole

1) **Stellar Evolution:** Those stars which are more massive like 20 times massive from the sun. The process of their end start with stellar evolution of becoming black hole.

2) **Supernova Explosion:-** When Nuclear fuel of such massive stars exhausts then ~~on~~ a explosion happen which we called is supernova. This is the process where the core of the star collapse under its own gravitational force and causing the explosion towards the outside ~~of~~

3) **Core collapse:-** After the supernova remaining core mass when reach at the above certain level (openhimmer limit) it will furthmore collapse under its own ~~grat~~ gravity and become black, thick, dense structure.

4) **Formation of Blackhole:-** A blackhole is formed because core density is too dense and thick that it create

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Singularity - This is the point of infinite density and this is surrounding by event horizon from which not even light can escape from this that's why gravitational pull of Black hole is too strong.

(C) Part

Why Atoms form chemical Bonds

Atoms form the chemical bonds to become more stable by its electronic configuration. This stability can be achieved by:

1) **Stable valance shell :** Atom engage in chemical ~~reaction~~ bonds to fill their outer most ~~el~~ valance electrons to complete its electronic confeguation of like the Noble gases. These Nobles gases valence electrons are either 2 (duel) or 8 (octate). which is energetically more stable.

2) **Minimizing Energy:-** Potential energy become Low during the process of bond formation. By combing, these atoms loose their energy and Leading towards the more stable form.

3) **Electron sharing and Transfer:-** To achieve the full valance shells, atoms form the chemical bond either by sharing (covalent Bond) or by complete transfer of electrons which is (Ionic Bond).

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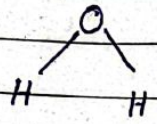
Structure of water

1) Molecular Structure:-

H_2O is the formula for the water



It has the bend or v-shaped structure. The bond angle between Hydrogen-oxygen-Hydrogen atom is approximately 104.5^{o}

2) Bonding – Covalent Bonds

H_2O (water) have 2 covalent bond with oxygen atom and each of the two with Hydrogen atoms. These involve the one pair share of electrons between Hydrogen & Oxygen atom

3) Polarity:- (Polar molecule)

H_2O (water) is a polar molecule because oxygen is the more electronegative then of the Hydrogen. This creates the partial negative charge on the oxygen & partial positive charge on the Hydrogen atom, leading to an overall dipole molecule.

4) Hydrogen Bonding:-

Water molecule contain the strong Hydrogen Bonding containing the attraction b/w the partial ~~negative oxygen~~ positive charge of the Hydrogen atoms of one molecule of the partial negative of oxygen atom of another molecule. The Hydrogen bonding is responsible for High boiling point & Specific heat capacity.

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(d)

(i) **Conductors**

Material that allow the free and easy flow of electric current and heat due to free moving electrons

Example:→ copper is widely used in electric wiring due to its electrical conductivity.

(ii) **Semiconductors:-** Material with electrical conductivity between insulators and conductors. The conductivity can be damaged or altered by adding impurities or environmental conditions.

Example:→ Silicon → used as computerchips.

(iii) **Metals:-** Good conductor of Heat and electricity and shining in appearance

Ex:→ Alluminium → use in packaging.

(iv) **Plastics:-** materials made from polymers They are insulating & non conductive.

Ex- Polythylene → Plastic bags.

Muskan

GSA mock = 04

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Section II

QNO6 (a)

Problem:→ Percentage increase = ?

Enrollment in Jan 2022 = 850 pupils

Enrollment in January 2023 = 1120 pupils.

Solution:→

Formula for percentage increase = $\frac{\text{Increase - Original}}{\text{Original}} \times 100$

$$\% \text{ increase} = \frac{1120 - 850}{850} \times 100$$

% increase = 31.76%.

% increase = 32%.

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(b) Son's age = x

Man's age = $5x$ years

2 years ago son's age was = $x-2$

Man's age was = $5x-2$

$$(x-2)^2 + (5x-2)^2 = 114$$

$$(x^2-4x+4) + (25x^2-20x+4) = 114$$

$$26x^2 - 24x + 8 = 114$$

$$26x^2 - 24x - 106 = 0$$

Divided by 2 $\quad 13x^2 - 12x - 53 = 0$

By Quardatic Equation

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$x = \frac{12 \pm \sqrt{144 - 4(13)(-53)}}{2(13)}$$

$$x = \frac{12 \pm \sqrt{2900}}{26}$$

$$x = \frac{12 \pm 53.85}{26}$$

~~$x = 2.53$~~

$$x = \frac{12 \pm 54}{26}$$

$$x = 2.538$$

$$x = \frac{-42}{26}$$

Can't solved.

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(c)

Solution:→ men has some hens and cows

hens = h

cows = C

Total NO of Heads = 48

hens and cows have one one head so

$$h + C = 48 \quad \rightarrow (1)$$

on the other hand, hens have 2 feets

cows have 4 feets

$$2h + 4C = 140$$

$$h + 2C = 70 \quad \rightarrow (2)$$

Subtracting equation 1 from equation 2

$$h + 2C = 70$$
$$h + C = 48$$
$$- \quad -$$
$$C = 22$$

$$C = 22$$

Put C = 22 in equation no 1

$$h + C = 48$$
$$h + 22 = 48$$
$$h = 48 - 22$$
$$h = 26$$

So, the Number of hens are 26

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(d)

Data:→ V = 40 km/h during the 1st half of the Journey
V = 60 km/h in 2nd half of Journey
Average speed of car = ?

Solution: $V = \frac{d}{t}$ (Formula for speed)

Let Total speed was D
For 1st half it D/2 and 2nd half also.

∴ First half of the Journey = $\frac{D}{2}$ at 40 km/h

2nd half of the Journey = $\frac{D}{2}$ at 60 km/h

For 1st half ⇒ Time t_1 = $\frac{\text{Distance}}{\text{Velocity}} = \frac{D/2}{40}$ hours = $\frac{D}{80}$ hours

For Second half = $T_2 = \frac{D/2}{60}$ hours = $\frac{D}{120}$ hours

Total time = $\frac{D}{80} + \frac{D}{120}$

$= \frac{3D + 2D}{240} = \frac{5D}{240} = \frac{D}{48}$

$\frac{240}{48}$

Total time = $\frac{D}{48}$

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

$= \frac{D}{D/48}$

Average speed = 48 km/h

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QNO7

(a) $\frac{x}{6} + 50 = 60$

$x = ?$

Solution

$$\frac{x}{6} + 50 = 60$$

$$\frac{x + 300}{6} = 60$$

$$x + 300 = 360$$

$$x = 360 - 300$$

$$\boxed{x = 60}$$

(b) odd one out

8, 16, 24, 34, 40, 48

34 is the odd one out. all numbers are divided by 4 ~~by~~ but 34 is not.

(c) Height = 15meter (Right angle)

Base = 20 meter

Aerial distance from the top of the tower = ?

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

By Pathogorus theorm

$(Hypoth)^2 = (Base)^2 + (Perpendicular)^2$

Base is 20

Perpendicular = 15meter

$(D)^2 = (20)^2 + (15)^2$

$(D)^2 = 400 + 225$

$d = \sqrt{625}$

$d = 25$ → aerial distance from the top of the tower.

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(d) let

x = For odd day where man stayed

y = For even days where man stayed

Tariff For odd days = 1000

Tariff for even days = 2000

Total amount = 30,000

Sol Total Amount paid

$$1000x + 2000y = 30000$$

Divided by 1000

$$\boxed{x + 2y = 30} \rightarrow (1)$$

Total number of Days are

$$x + y$$

Odd dates = 5th, 7, 9, 11 ....

Even dates = 6, 8, 10, 12 ....

$$x + 2y = 30$$

If $y = 10$ (even dates)

$$x + 20 = 30$$

$$\boxed{x = 10}$$

This solution refer that he stayed for 10 odd and 10 even days

Total number of days stayed are

$$\boxed{x + y = 10 + 10 = 20}$$, 20 days.