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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 1 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 questions in words. You need to understand that a 5 mark part requires all steps written and explained.

Good luck for CSS 2026. You're gonna rock in sha Allah. :)

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2. Energy

Stars are extremely hot and produce their own energy through a process called 'Nuclear fusion'.

2. Energy

Planets mainly derive their energy from the stars and their temperature depends on their proximity to the star.

Planets such as mercury that are nearer to sun (star) are hotter compared to those that are far away eg Neptune.

3. Orbit

Stars usually orbit around the center of galaxy

3. Orbit

Planets orbit around the star.

4. Size

Stars are usually much larger in size.

4. Size

Planets are smaller in size when compared to the stars.

5. Example

* Sun

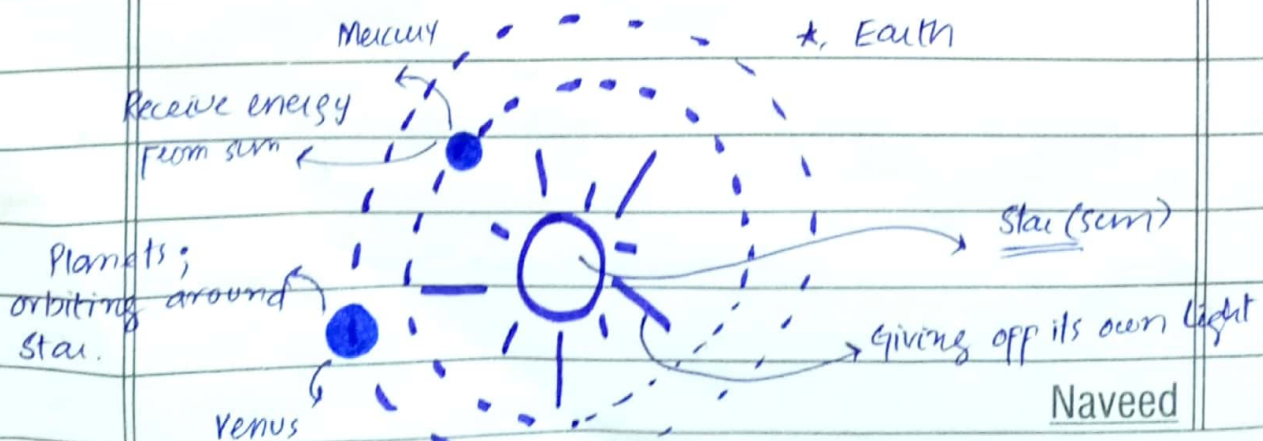
* Proxima Centauri

5. Example

* Mercury

* Venus

* Earth



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4. Lifecycle of a Star from Nebula To Blackhole

1. Nebula

A star begins its life inside a nebula, a cloud of dust and gas. The particles come together due to the gravitational pull.

2. Protostar

As the cloud collapses, it heats up and forms a protostar.

3. Main Sequence Star

* When nuclear fusion starts (hydrogen turning into helium), the star enters its longest and most stable phase called the main sequence.

* A star spends 90% of its life in the main sequence stage.

* Our sun is in main sequence stage.

4. Red Giant

* When hydrogen fuel runs out, the star expands and becomes a Red Giant or Supergiant.

* Example: Betelgeuse is in Red Giant phase.

5. Supernova

Extremely massive stars explode in a powerful burst called supernova, releasing huge energy.

6. After Supernova, a star can take two paths

Paths

1. Blackhole

2. Neutron Star

* Very Massive stars collapse under gravity and form a blackhole.

* Medium stars become neutron star.

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(6)

Semiconductors:

"Semi-conductors are the materials that have properties in between that of conductors and insulators"

"Semiconductors have a conductivity between conductors and insulators"

Explanation:

- * Semiconductors can be in the form of compounds.

For example: Gallium Arsenide

- * Semiconductors can also be in the form of pure elements.

For example: Germanium and Silicon

- * The resistivity of semiconductors decreases with the increase in temperature.

$\downarrow \text{Resistivity} \propto \frac{1}{\text{Temperature} \uparrow}$

- * Semiconductors are used in many modern day equipments, almost in all electronic devices.

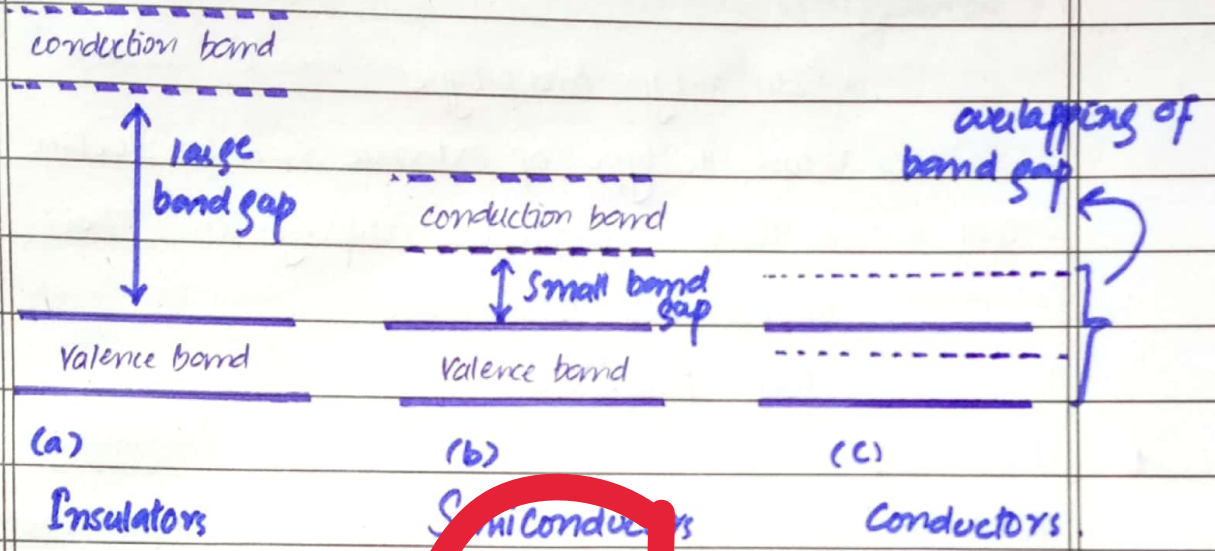
- * Semi-conductors make devices smaller, faster, and more efficient.

- * The energy bandgap in semiconductors is smaller than the insulators and larger than the conductor.

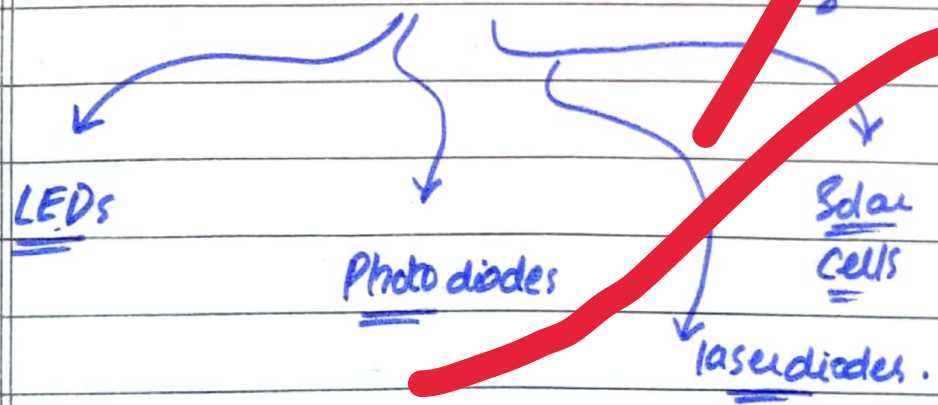
- * This bandgap allows semiconductors to behave as needed

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as conductors as well as insulators under certain conditions.



- * As the semi-conductors have small bandgap, when energy is applied, the electrons easily jump from valence band to the conduction band and become available for conduction. This allows semi-conductor to behave as conductors.
- * Otherwise, under normal conditions, they behave as insulators.
- * This property make them ideal for controlled conduction.
- * Semiconductors are used in making



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Difference

↳ n-type Semi-conductors

↳ P-type Semi-conductors

* Both, n-type and p-type

Semi-conductors are type of extrinsic semi-conductors that means there are impurities (doping) in these semiconductor to enhance their properties.

1. Doping (Pentavalent-Impurity)

The n-type semiconductors are doped with elements that have extra electrons or negative charge carriers.

2. Example:
Phosphorous,
Antimony

3. Naming

Therefore, due to the excess of certain charge carriers (eg negative), it is named as n-type.
 $n \rightarrow$ "negative".

4. Working

The extra electrons that are added make it easier for the current to flow.

1. Doping (Trivalent)

The p-type semiconductors are doped with elements that have extra holes or positive charge carriers.

2. Example:
Gallium,
Boron

3. Naming

Due to the excess of positive charge carriers in the donor impurity, it is named as p-type.
 $p \rightarrow$ "positive".

4. Working

The extra holes create missing places where electrons

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can jump into these holes, effectively allowing current to flow.

5. Application

- (i) Solar cells
- (ii) Transistors in computers

5. Application

- (i) LEDs (forward biased)
- (ii) laser diodes.



4 Global Warming:

"Global Warming refers to the long-term increase in the average temperature of the Earth due to excessive greenhouse gases in the atmosphere due to anthropogenic activities"

4 Anthropogenic activities:

These are the human activities that are mainly responsible for the excessive emission of the greenhouse gases (GHGs) in the atmosphere that are mainly driving the global warming.

These activities includes:

- * Burning of fossil fuels
- * Deforestation
- * Industrial pollution etc

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↳ Mechanism of Greenhouse Effect:

1. Sunlight reaches Earth

The sunlight reaches Earth from the sun in the form of short-wave radiation. It warms the Earth.

2. Earth absorbs and re-emits this heat

The Earth absorbs this energy and releases it back as long-wave infrared radiation.

3. Greenhouse gases trap this heat

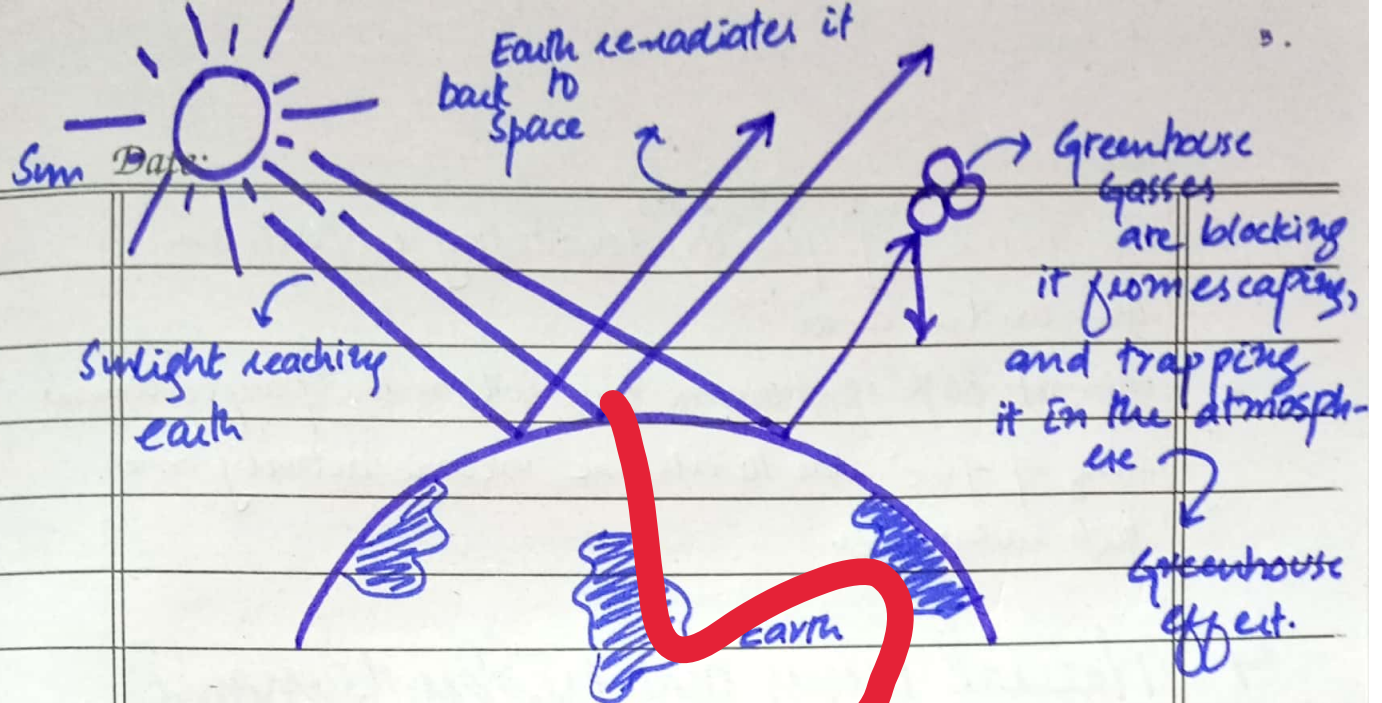
But the greenhouse gases trap this heat and stops it from going out. In this way the heat is trapped in our atmosphere.

4. This trapped heat warms the planet

The trapped heat increases the Earth temperature, just like the glass of a greenhouse that keeps planet plants warm.

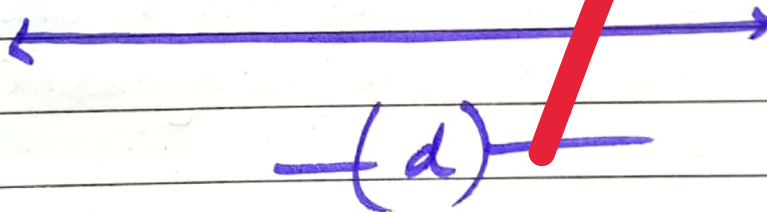
This natural process has become harmful due to the excessive amount of greenhouse gases in our atmosphere that are trapping more and more heat, thereby, increasing the Earth's temperature.

↳
(Enhanced Greenhouse Effect)



↳ Major Greenhouse Gases:

1. Carbon dioxide (CO_2)
2. Methane (CH_4)
3. Nitrous Oxide (N_2O)



↳ Bunami:

"Bunami is a series of oceanic waves that are triggered by sudden disturbances such as underwater earthquakes, volcanic eruptions, or landslides"

↳ Explanation

The word is derived from two words

'tsu' → harbor

'nami' → wave

Date:

The name signifies its devastating impacts on the coastal areas.

- * Almost 80% of tsunami occur within the 'Pacific Ocean's ring of fire' due to extreme volcanic activity and high earthquakes.

4 Natural process that trigger tsunami:

Tsunami are usually generated by sudden disturbances under that displace the sea water. The main natural processes are:

1. Undersea Earthquake

Most tsunami occur due to tectonic plate movements undersea, that led to the earthquakes.

When one plate shifts or slips under the other (subduction zone), the seafloor shifts, pushing a huge volume of water upward.

Example:

2004 Indian Ocean tsunami, caused by a magnitude of 9.1 earthquake off the coast of Sumatra

2. Volcanic Eruptions

Explosive eruptions underwater also displaces the seawater and led to the massive tsunami.

Example:

Pacific Ring of fire is an active zone that leads to tsunamis due to volcanic eruptions.

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↳ Potential impact on coastal areas:

Tsunami wreaks havoc on the coastal areas & have devastating impacts.

1. Loss of life

Tsunami is destructive and destroys everything in its path. It leads to massive casualties in coastal areas.

Example:

2004 Indian Ocean Tsunami killed approximately 2,30,000 people in 14 different countries.

2. Loss of Infrastructure

Tsunami destroy all the coastal infrastructure, homes, schools, and other nearby building.

3. Impact on Economy

Tsunami affects the tourism that drives the economy of coastal areas. It blocks tourism and also it takes time to rebuild infrastructure destroyed during tsunami.

4. Impact on Environment:

Tsunami leaves massive debris as well as small fishes on the coast that negatively impacts the environment.

5. Flooding of coastal areas

lands near the shore can be flooded damaging crops and affecting food supply and work.

Date: _____

~~Q#4~~

(a)

→ Rock Cycle:

"It is a natural process through which rocks are formed, broken down, and transformed into different types over time"

"It is a continuous and dynamic cycle that shows relationship between the three main types of rocks:

1. Igneous
2. Sedimentary
3. Metamorphic

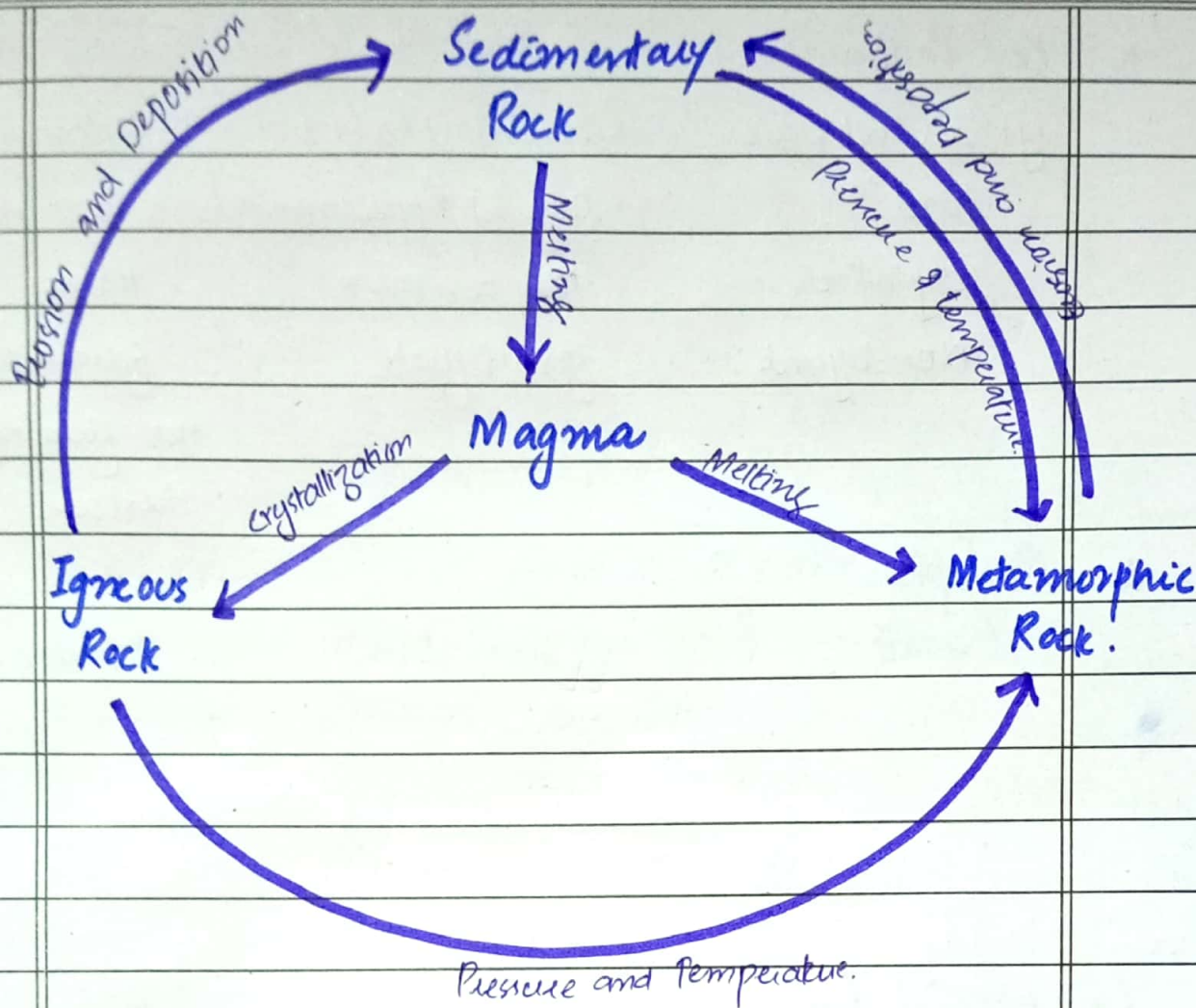
process:

It is driven by 2 forces:

1. Earth's Internal Heat, which moves material around in the core and mantle, leading to slow but significant changes within Earth crust.

2. The hydrological cycle, which is the movement of water, ice, and air at the surface, powered by the sun.

Date:



Difference

<u>Igneous Rock</u>	<u>Sedimentary Rocks</u>	<u>Metamorphic Rocks</u>
* Igneous Rocks are formed by cooling and solidification of magma and lava	* Sedimentary rocks are formed by compaction of sediments (sand, mud, or organic matter)	* Formed when the existing rocks undergo heat and pressure inside earth.

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* Key Features:

Igneous Rocks are:

Hard
Crystalline,
Non-layered

Sedimentary Rocks:

layered Appearance,
May contain
fossil fuels.

Metamorphic

Rocks are:

Hard,
foliated or
non-foliated
texture.

* Examples:

Basalt

Limestone

Marble.



(b)

↳ Acid Rain

"Acid rain is known as acid deposition, is a form of precipitation with elevated levels of acidic components like Sulphuric and nitric acid."

Explanation:

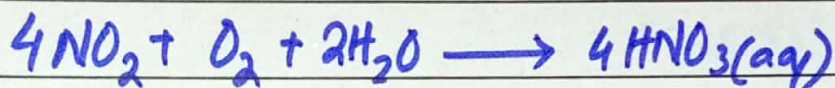
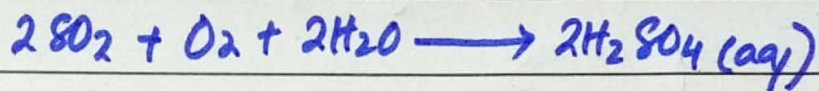
* It occurs when Sulphur dioxide (SO_2) and nitrogen oxide (NO_x) are released into atmosphere, often from industrial emissions.

* These then react with water, oxygen, and other chemicals and form acidic pollutants that come to the ground as rain, snow, fog or dust.

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↳ Chemical Reactions involved in the formation of acid rain:



* Sulphur dioxide (SO_2) and Nitric Oxide (NO_2) mix with water (H_2O) and oxygen (O_2) in the atmosphere, transforming into

1. Sulphuric Acid $\hookrightarrow \text{H}_2\text{SO}_4$
2. Nitric Acid $\hookrightarrow \text{HNO}_3$.

* pH is below $\hookrightarrow$ 5.6.

↳ Harmful Effects:

(i) On Aquatic Life:

* Fishes and amphibians die when water becomes too acidic. The eggs of these organisms cannot survive in such conditions.

* The entire food chain is disrupted.

(ii) On Vegetation:

* Damages leaves and turn them yellow or brown and weakens the plant thereby reducing their ability to photosynthesize.

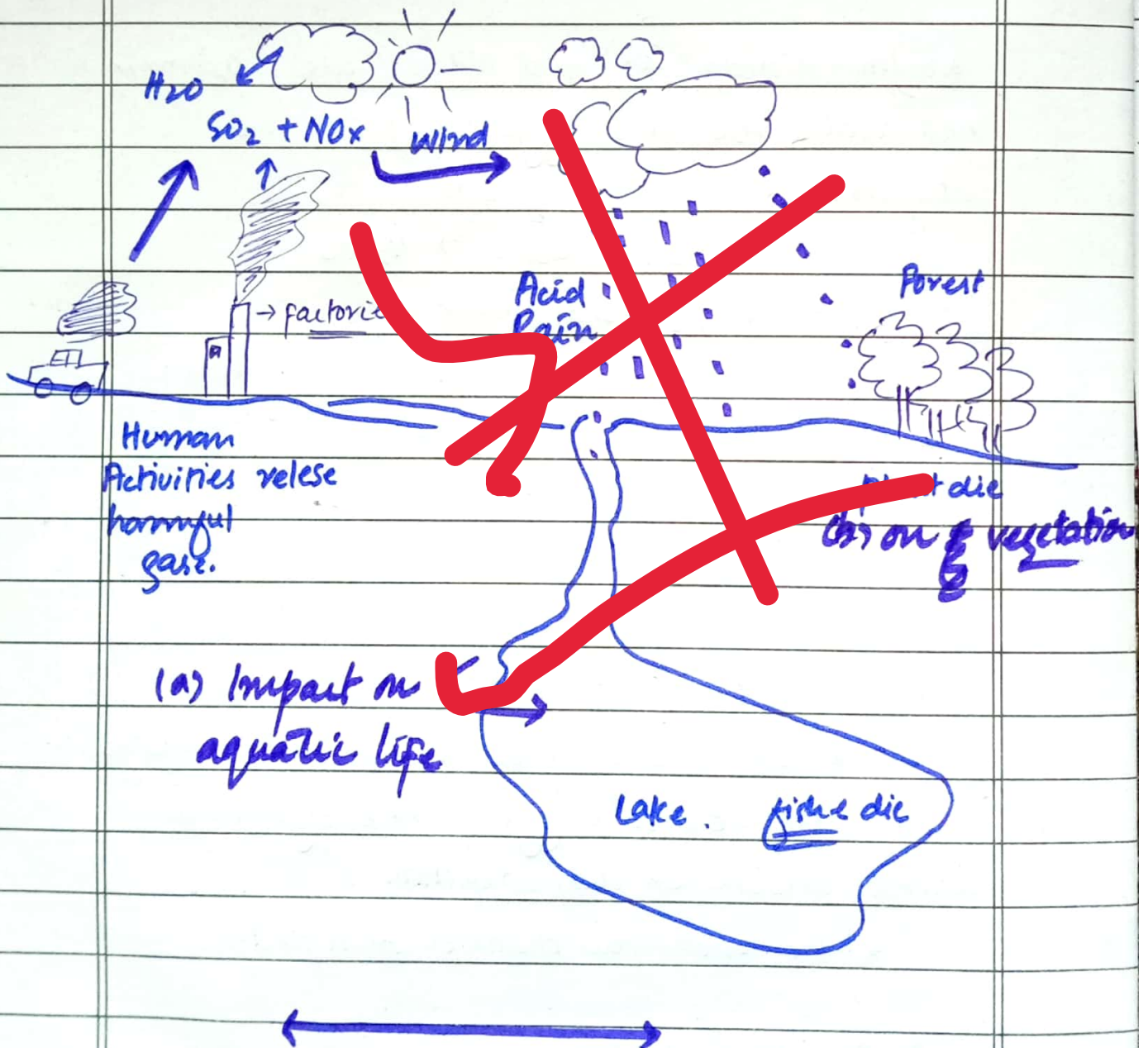
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* Essential minerals e.g. calcium are washed away due to acid rain (leaching).

* Crop productivity drops due to nutrient loss and leaf damage.

↳ Diagram



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(c)

↳ Role of Remote Sensing in Environmental Monitoring and Disaster Management:

(1) Environmental Monitoring:

* Remote sensing uses satellites and aerial imagery to observe earth from a distance

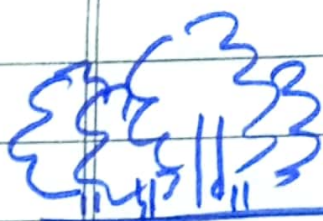
* It helps track deforestation, desertification, water pollution, melting glaciers, land use change, and air pollution.

* It provides continuous, large scale, real time data that helps detect environmental degradation early.

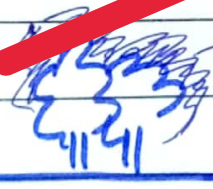
(2) Disaster Management:

* Remote sensing gives quick images before, during, and after disasters like

- ↳ floods
- ↳ cyclones
- ↳ Earthquakes
- ↳ wild fires
- ↳ Drought



Before
wild fire



During

fire engulfing
trees and
vegetation



After.

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Destroyed area

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* Remote sensing also helps to identify affected areas, assess damage and it also help in rescue and relief operations.

↳ Role of GIS in Environmental Monitoring and Disaster Management

(1) Environmental Monitoring:

* GIS analyzes the geographic data and helps to create maps and models.

* It helps in monitoring soil erosion, water resources, biodiversity, climate patterns etc.

(2) Disaster Management:

* It can help in identifying

↳ flood zones

↳ earthquake prone areas

↳ wildfire risk areas

↳ landslide prone areas.

Himalaya

Hindukush

Karakoram

* It is used for Early warning system, evacuation route planning etc.

* It also help in coordination of relief and reconstruction after disasters.

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—(1)—

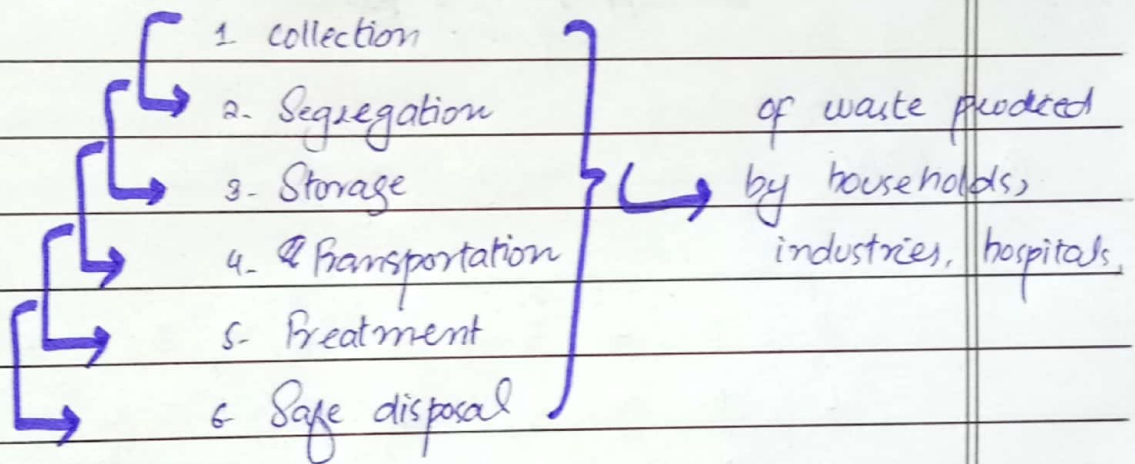
4 Solid Waste Management:

"It refers to the systematic handling of waste from its

Generation → Final disposal"

Explanation:

It includes



4 Environmental Hazards of Improper disposal of Urban waste

(1) Soil pollution

Waste dumped on open spaces and land releases toxic chemicals that can contaminate soil and reduce its fertility.

(2) Water pollution:

Leachate from improper waste disposal seeps into rivers, lakes, and groundwater, leading to its contamination + water borne diseases --

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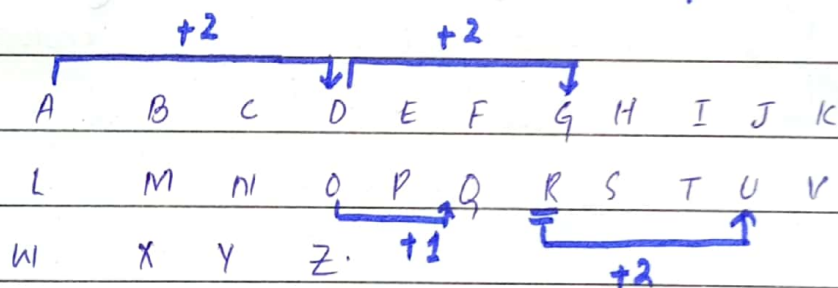
(3) Air pollution

Burning of wastes produces harmful gases that worsens air quality $\rightarrow$ Respiratory diseases.

~~(Section-I)~~

~~(Q#8)~~

① ROAD $\rightarrow$ UQDG



Rules

$R+2 \rightarrow U$

$O+1 \rightarrow Q$

$A+2 \rightarrow D$

$D+2 \rightarrow G$

Therefore, road is coded as uqdg.

② So,

LAKE $\rightarrow$ OCNH

Rule

$L+2 \rightarrow O$

$A+1 \rightarrow C$

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$$K + 2 \rightarrow N$$

$$E + 2 \rightarrow H$$

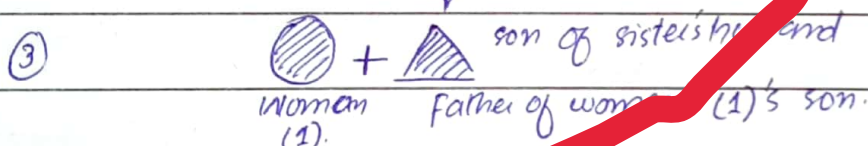
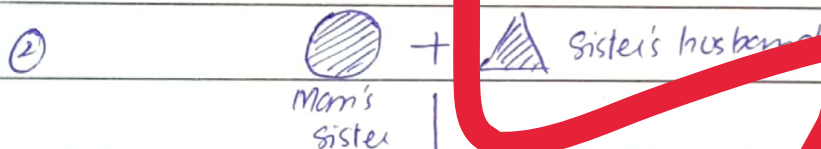
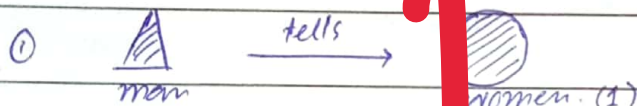
Hence,

LAKE is coded as OCNH



(b)

Analyzing step by step



④ It means she is the wife of man's sister's son.

Answer;

⑤ The woman will be the

Neice-in-law of the man

As she is married to the man's Nephew.



(c)

(1)

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

Date:

Explanation

$$4 \times 3 = 12$$

$$12 \div 2 = 6$$

$$6 \times 3 = 18$$

$$18 \div 2 = 9$$

$$9 \times 3 = 27$$

$$27 \div 2 = 13.5$$

(2)

$$1, 2, 6, 24, 120, 720$$

Explanation

$$1 \times 2 = 2$$

$$2 \times 3 = 6$$

$$6 \times 4 = 24$$

$$24 \times 5 = 120$$

$$120 \times 6 = 720$$



(d)

Given:

shortest person = 150 cm

Tallest person = 180 cm

① $\text{Range} = \text{Maximum} - \text{Minimum}$

$$= \text{Tallest} - \text{Shortest}$$

$$= 180 - 150 = 30 \text{ cm.}$$

② The third tallest friend:

Given

$$R < P < Q < S < T$$

Date:

If the third tallest according to order will be

"9"

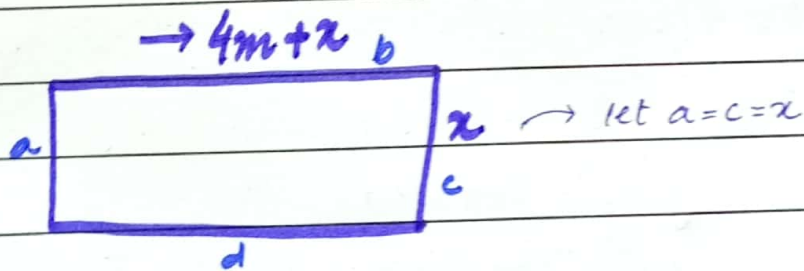
— (9#7) —

(b)

Length of the rectangular swimming pool = 4 m more than its width.

perimeter = 72 m.

volume of water to fill pool = ?
depth = 2.5 m.



so,

$$\text{perimeter} = a + b + c + d$$

$$\text{perimeter} = 2(L + W)$$

$$\frac{36}{2} = \frac{72}{2}$$

$$\frac{36}{2} = 18$$

$$= (4m + x) \times x$$

$$= 4x + x^2$$

$$\text{Perimeter} = 2(L + W)$$

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

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

$$72 = 4x + 8$$

$$4x = 72 - 8$$

$$4x = 64$$

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

$$x = 16$$

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Date:

So,

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

$$\text{length} = x + 4 = 1 + 4 = 20 \text{ m.}$$

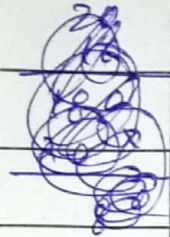
Volume

$$= l \times w \times \text{depth}$$

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

$$= 8000$$

$$= 8000 \text{ m}^3$$



20

16

120

20 x

320

320

25

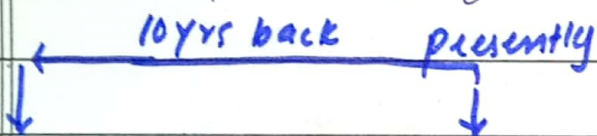
1600

640 x

8000

Let the present age of father = y

Let the present age of son = x



Father's age

$$y - 10 = 4(x - 10)$$

$$x + y = 75 \text{ yrs}$$

So,

$$y - 10 = 4x - 40$$

$$y = 4x - 40 + 10$$

$$y = 4x - 30$$

By putting value of ' y '

$$x + 4x - 30 = 75$$

$$5x = 75 + 30$$

$$5x = 105$$

$$x = 21 \rightarrow \text{Present age of son.}$$

for father.

$$x + y = 75$$

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Date:

$$21 + y = 75$$

$$y = 75 - 21$$

$$y = 54$$
 current
age of
father

75

21

54

