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GSA

Q.2 :

(a)

Igneous Rocks	Metamorphic Rocks
Igneous rocks are the type of rock that are formed from cooling and solidification of molten lava or magma.	Metamorphic rocks are formed when existing rocks undergo changes due to environmental factors (i.e heat, pressure etc).
• Characteristics :-	• Characteristics :-
→ Igneous rocks have crystalline texture	→ Metamorphic rocks exhibit mineralogic changes so they have
→ They are hard and dense in nature.	foliated or non-foliated texture
→ Igneous rocks are mostly made of silicates, which means they contain Si and O_2.	→ They are harder than original rock.
• Classification:	• Classification:
⇒ On the basis of formation, they are classified as :	⇒ On the basis of formation they are classified as :
→ Intrusive :- Formed when magma cools slowly beneath earth's surface, resulting in coarse-grain texture. i.e Granite	→ Regional metamorphism :- When rocks are subjected to intense pressure and high temperature over extensive region. i.e slate
→ Extrusive: Formed when lava cools rapidly on earth's surface, resulting	→ Contact metamorphism :- When rocks are heated

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fine-grained (glossy) texture. There are small or no visible crystals in this type of rocks.
i.e:- Besalt

⇒ On the basis of compositions:-

→ Magic rocks:- They are rich in magnesium and iron i.e:- Besalt

→ Felsic rocks:- They are rich in silica i.e granite

• Importance:-

→ Crucial for understanding earth's internal processes.

→ Provide information about tectonic plate activities

→ Rich in minerals like iron, and magnesium.

by nearby magma or lava intrusions, contact metamorphism occurs. Heat and pressure minimum role during the process.
i.e Marbale

⇒ On the basis of composition

→ Foliated:- Minerals are aligned in layers due to pressure e.g schist

→ Non-foliated: Lacks a layered structure e.g quartize.

• Importance:

→ They also reveal tectonic history and condition of earth's crust

→ They are more valuable in construction.

(b)

Smog:-

→ It is a type of air pollution and occurs when harmful particles and gases accumulate in the atmosphere.

→ This causes the formation of dense

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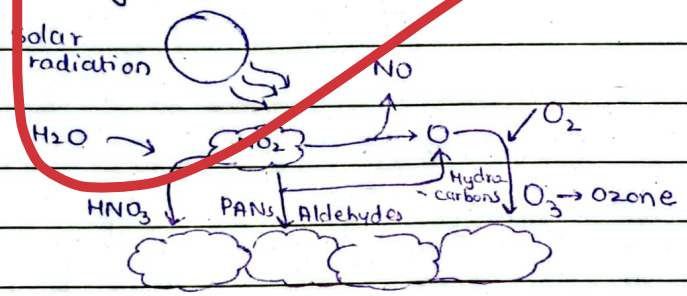
hazy layer near the ground ~~that~~

→ Smog originally is the combination of words "smoke" and "fog".

Phenomenon of smog:-

Smog ~~particle~~ formation takes place when pollutants like nitrogen oxide (NIO_x) and volatile organic compounds (VOCs) react with either sunlight or mix with particulates like chemicals. ~~of~~ This phenomena can intensify with meteorological conditions like low humidity or wind speed.



Types of smog:-

There are two types of smog

1. **Photochemical smog:-**

→ Formed when sunlight react with NO_x and VOCs pollutants.

→ The main component of this smog is ground-level ozone formation.

→ Source of production of these pollutants are vehicles and industrial processes.

→ They is appear as yellowish-brown in color.

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→ Photochemical smog can cause respiratory problems, damage crops and can also deteriorates rubber and plastics.

2- **Industrial smog:-**

→ Formed when SO_2 is produced by the burning of fossil fuels and combines with particulates and water-vapors.

→ The main component of Industrial smog is sulfurous compounds.

→ Factories, powerplants and domestic heating using coal acts as source of production of these pollutants.

→ It appears grayish or almost black in color.

→ Industrial smog can cause cardio-vascular diseases, reduce visibility and worsen respiration. It can is also major cause of acid rain.

(c) **Importance of Risk assessment:-**

Risk assessment is the first and most important component of DRM (Disaster Risk Management). To deal with a potential hazard effectively, it is necessary to assess the risk thoroughly.

→ Risk assessments helps in recognizing natural, technological and human-induced hazards that could lead to disaster.

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→ It helps in examining the weaknesses in infrastructure, communities and systems that make them susceptible to hazards.

→ Through risk assessment, it becomes easy to prioritize tasks based on the catagorization of risk's potential impacts.

→ Helps in identifying risk factors that can be minimized through mitigation measure, like building resilent infrastructure and improving ecosystem management.

→ Risk assessment plays important role in duly guiding policymakers, planners and stake-holders in making informed decisions about resource allocation and risk reduction investments.

So, by identifying risks before disaster occurs risk assessment significantly contributes to saving lives, reducing economic losses and fostering sustainable development.

(d) • **Short sightedness:.**

It is a vision condition, where distant objects appear blurry but close objects can be seen clearly. Another name for this condition is called Myopia.

→ Causes:-

→ The eyeball is too long or the cornea is too curved, which causes the

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light rays to focus in front of retina instead of directly on it, thus making the object near the eye to be seen clearly.

→ Treatment:-

Using concave lenses can help in seeing far objects as it ensures the focus of light rays to fall correctly on retina. Another solution is to use contact lenses or get a laser eye surgery.

• Far Sightedness:.

It is an eye condition where close objects appear blurry but distant objects can be seen clearly. It is also known as Hyperopia.

→ Cause:-

The eyeball is too short or the cornea is too flat, which causes light rays to focus behind the retina instead of directly on it.

→ Treatment:-

Using convex lenses can help as they convery light rays, bringing them into proper focus on retina. Also contact lenses or laser eye surgery can be effective in addressing hyperopia.

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Q.5.
(a). **Sea surface temperature (SST) rise:-**

→ It refers to the increase in the temperature of ocean's surface, typically caused by global warming due to increased green house gas emissions.

→ The ocean absorbs about 90% of the heat generated by Global warming, leading to significant warming of the upper layers of sea water.

→ Effect of SST on formation of Tropical cyclone:-

Tropical cyclones are highly sensitive to sea surface temperatures. Warmer ocean waters provide more energy for these storms to form and intensify.

- Increased Evaporation:-

Warmer seas lead to higher rates of evaporation, increasing maisture in atmosphere, which feeds the development of clouds and storms, that cause formation of tropical cyclones.

- Enhanced temperature Instability:-

Warm waters create temperature gradient between sea surface and the upper atmosphere. This gradient destabilizes the atmosphere, facilitating the upward motion of air which can cause tropical cyclones.

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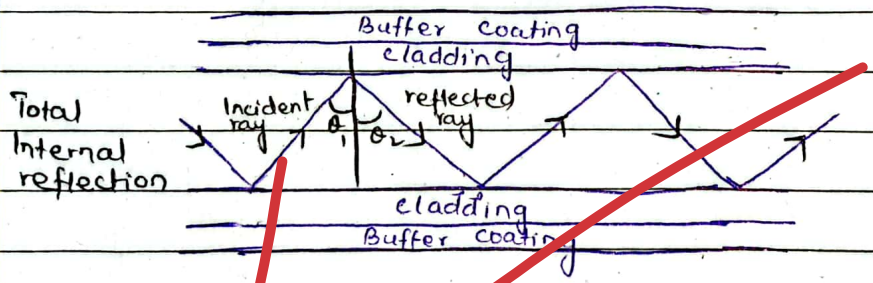
- Greater Latent Heat Release:-

As moisture air rises and condenses into clouds, it releases latent heat, this heat further energizes the storm (stronger winds and low central pressure).

(b) **Working of optical fibre:-**

Optical fibre is the technology associated with data transmission using light pulses traveling along with a long fibre, which is usually made of plastics or glass.

Fibre ~~opting~~ optics uses application of Total Internal reflection of light. It states that light hits glass at shallow angle (less than 42°), which is reflected back in again (as though the glass was a mirror), which keeps the light in the pipe.



As light travels in straight line, not possible to have a single straight wire to transfer data, so optical fibres bend light inward using TIR.

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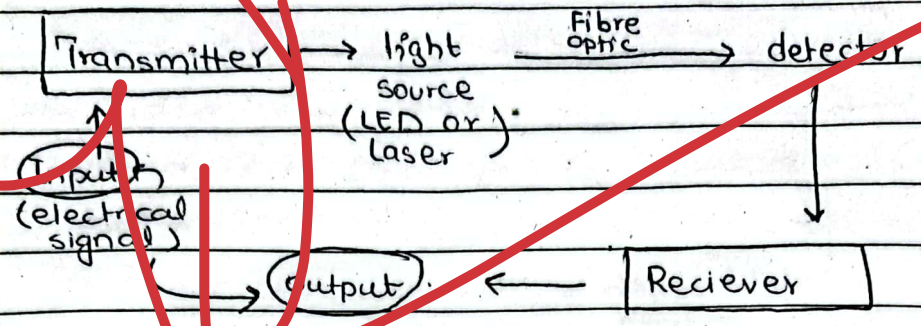

Process of transmission

(c) Microorganisms are central to the production of biofuels, which are renewable and eco-friendly alternatives to fossil fuels. • Biofuels can be produced as follows;

Bioethanol :-

Microorganisms like yeast ferment sugars from crops like corn, sugarcane and cellulosic biomass to produce ethanol.

Biodiesel :-

Microalgae and bacteria like Rhodococcus produce lipids that can be converted into biodiesel through transesterification.

Biobutanol :-

clostridium acetobutylicum ferments sugar to produce biobutanol which has similar properties to gasoline.

• Biogas can be produced when anaerobic bacteria break down organic waste, including agricultural residues, food waste and sewage.

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- Biohydrogen is produced when certain microorganisms, such as cyanobacteria and purple non-sulfur bacteria, produce hydrogen gas through photosynthesis or fermentation. It is a clean fuel that produce only water when burned, making it an ideal alternative energy source.
- Synthetic biology and genetic engineering enables microbes like Escherichia coli to produce biofuels more efficiently.
- Microbial fuel cells (MFCs) are produced when microorganisms such as Shewanella can generate electricity by breaking down organic matter in MFCs.

Thus microorganisms offer scalable and diverse solutions to mitigate fuel shortages while also promoting sustainability.

(d)

Food additives:

→ Food additives are substances added to food to enhance its quality, flavor, texture or appearance.

→ They are generally used in small amounts.

→ Following are the catagories of food additives.

- Flavor enhancers: Improve or

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intensity the taste (e.g MSG).

- Coloring agents (to add color)
- Stabilizers:- To improve texture.
- Sweeteners: Provide sweetness with few calories e.g: Sucralose.

Food Preservatives:

→ Food preservatives are a specific type of food additives that are used to prevent spoilage caused by micro-organisms, oxidation or enzymatic reactions.

→ The primary purpose is to maintain food safely.

→ There are two types of preservatives.

- Natural preservatives:

These includes salt, vinegar and natural acids.

- Chemical Preservatives:

These includes benzoates, nitrates and sulfits which inhibit microbial growth or oxidation.

Section B

Q.7:. (a)

Given data:

Let the 7 consecutive numbers be: $x, x+1, x+2, x+3, x+4, x+5, x+6$.

The average of these numbers is 20.

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To find:-

Largest of these numbers.

Solution:-

As it is already given;

$$\frac{[x+(x+1)+(x+2)+(x+3)+(x+4)+(x+5)+(x+6)]}{7} = 20$$

So, by simplifying it we get,

$$\frac{7x+21}{7} = 20$$

$$7x + 21 = 140$$

$$7x = 140 - 21$$

$$7x = 119$$

$$x = \frac{119}{7}$$

$$\boxed{x = 17}$$

This is the first number, so in order to get the largest number, we will add 6 in it.

$$x + 6 \Rightarrow 17 + 6 = 23$$

Largest number = 23

(6)

As C is A's father's nephew, so then C and A are cousins. But as stated, D is A's cousin and not brother of C, so the relationship between D and C is that they are **cousins**.

(c) (i) 4, 18, ____, 100, 180, 294, 448

The sequence of the terms can be determined as,

→ $2^2 \times 1 = 4$ → $3^2 \times 2 = 18$

→ $4^2 \times 3 = ?$ → $5^2 \times 4 = 100$

→ $6^2 \times 5 = 180$ → $7^2 \times 6 = 294$

→ $8^2 \times 7 = 448$

So, the missing number is **48**

(ii) 1, 2, 10, 37, 101, ____.

The sequence follows a pattern of sum of cubes of consecutive numbers.

e.g. → $1 + 1^3 = 2$ → $2 + 2^3 = 10$

→ $10 + 3^3 = 37$ → $37 + 4^3 = 101$

→ So, this should be

$101 + 5^3 = 226$

missing number is **226**

(iii) - 11, 17, 39, 85, ____.

(iv) - 13, 24, 46, 90, 178, ____.

The difference of each consecutive numbers are;

→ $24 - 13 = 11$, → $46 - 24 = 22$

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→ 90 - 46 = 44 → 178 - 90 = 88.

A sequence between these numbers can be seen,

$11 \times 2^0 = 11$, $11 \times 2^1 = 22$

$11 \times 2^2 = 44$, $11 \times 2^3 = 88$ so the next number would be

$11 \times 2^4 = 176$

Now, adding $178 + 176 = 354$

Missing number is **354**

(v)_ 4, ____, 144, 400, 900, 1764

The pattern that can be seen is,

→ $2^2 = 4$, → $12^2 = 144$ → $20^2 = 400$

→ $30^2 = 900$ → $42^2 = 1764$

The difference between numbers increases by 2.

20 - 12 = 8

30 - 20 = 10 (8+2)

42 - 30 = 12 (10+2)

so, 8 → (6+2)

the missing number would be

12 - 6 = 6.

so $6^2 = 36$.

(d)_ Given:-

A : B = 1 : 2

B : C = 3 : 2

C : D = 3 : 4

Difference in shares of A and D

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is 2240.

To find:

Shares of B.

Solution:

~~As the question suggests~~

As stated in the question

→ $B = 2A$

→ $C = 2/3\ B$

→ $D = 4/3\ C$

As given;

$A - B = 2240$

$A - 4/3\ C = 2240$

$A - 4/3\ (2/3\ B) = 2240$

$A - 4/3\ (2/3\ (2A)) = 2240$

Simplifying

$A - 4/3\ (4/3\ A) = 2240$

$A - 16/9\ A = 2240$

$\frac{9A - 16A}{9} = 2240$

$7A = 2240 \times 9$

$A = \frac{2240 \times 9}{7}$

$A = 2880$

Now, as $B = 2A$

$2(2880)$

$B = 5760$ Rs.

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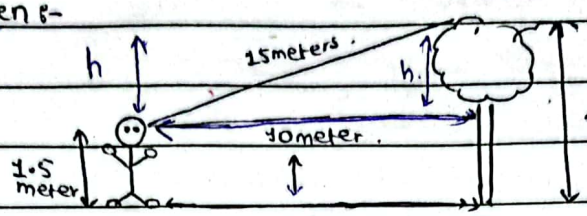
Q.8:

(a)

Given:-



To find:-

height of tree = x = ?

Solution:-

As the distance between ali and tree is 10 meter, it is assumed and the hypotheneuse value from eyes of ali to top of tree is 15meters, so according to above diagram, we can find h.

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

$$(15m)^2 = (10m)^2 + h^2$$

$$225 = 100 + h^2$$

$$h^2 = 225 - 100$$

$$h^2 = 125$$

$$h = 25m.$$

Now, to get full height of tree, lets add all heights.

$$x = 1.5m + 25m$$

$$x = 26.5m.$$

Height of Tree = 26.5m.

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(b)

SONCCUOISIENT →

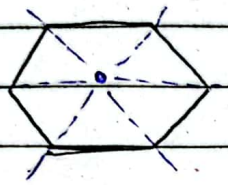
EIVENPRRAOST →

UORSIULDC → LUDICROUS

UNSPRESE → PURENESS

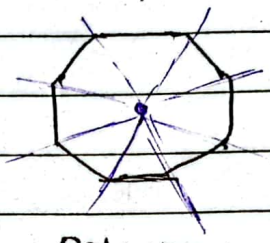
NMILAOPC → COMPLAIN

(c)



Hexagone

A Regular hexagon has 6 lines of symmetry



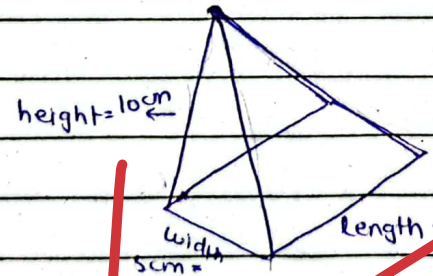
Octagone

A regular octagon has 8 lines of symmetry

Circle:-

A circle has infinite lines of symmetry.

(d)



Rectangular Pyramid.

To find:-

Volume =>

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Formula:-

$$V = 1/3(lwh)$$

Solution:- Puting values, we get

$$V = 1/3(7 \times 5 \times 10)\,cm^3$$

$$V = \frac{1}{3}(350)\,cm^3 \quad (116.6\ldots)$$

$$\boxed{V = 116.66\,cm^3}$$

Improve content
Make headings in the answers
Keep length of all questions equal
Understand the question carefully
Draw flow charts
Use scientific terminologies
Use scientific examples
Follow step by step method for maths problems
The answers are insufficient to fulfill the required criteria of the question and marks.
Work hard.