

# General Science Ep Ability

## PART-II SECTION A

### QUESTION NO. 2

(a) Differentiate b/w Igneous rocks & Metamorphic rocks

Igneous Rocks	Metamorphic rocks
1) Formed by cooling and Solidification of molten magma or lava	(1) Formed when existing rocks subjected to heat pressure or chemical process
(2) Result from volcanic activity	(2) Result from geological Processes
(3) Crystalline texture	(3) Layered or non-foliated texture
(4) Example: Granite	(4) Example: Marble
(5) Primary rocks	(5) Secondary rocks

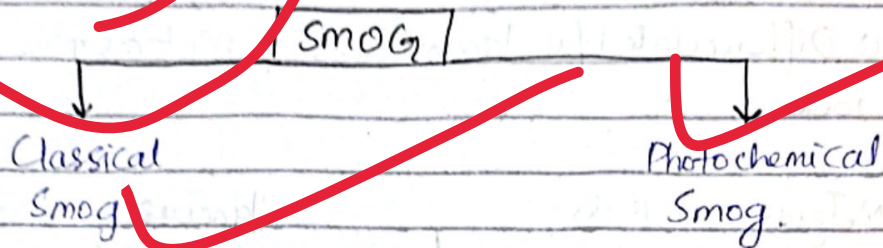
(b) Explain the phenomenon of smog & give its types.

Smog is a type or form of pollution which usually occurs when pollutants in the atmosphere are mixed with the fog, forming a dense layer of polluted air. It is caused by human activities like burning of fossil fuels, industrialization, vehicular exhaust.

Smog has two types:

- 1) Classical smog: occurs in cool climates and is caused by combination of smoke and sulfur dioxide ( $SO_2$ ), released from burning fossil fuels like coal.
- 2) Photochemical smog: occurs in warm climates due

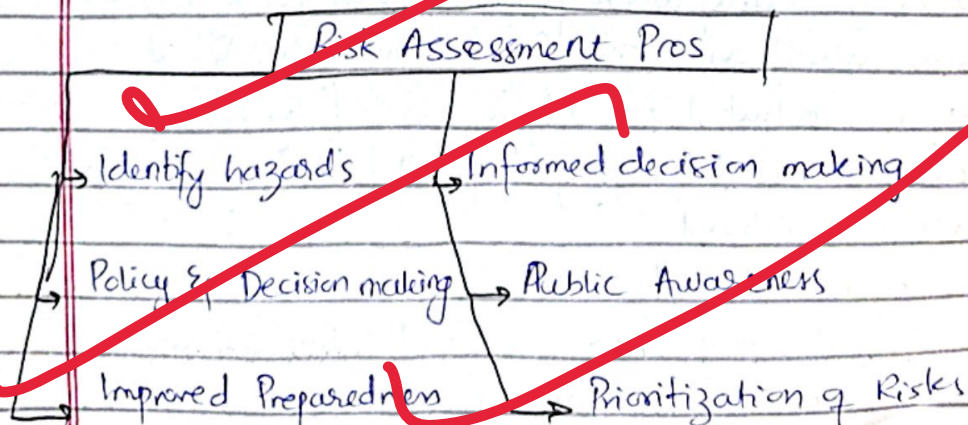
to chemical reactions between sunlight, nitrogen oxide and volatile organic compounds released by vehicles and industries.



(c) Give the importance of Risk assessment in DRM.

Disaster Risk Management (DRM) is the systematic processes of identifying, assessing and reducing disaster risks to protect lives, property and the environment.

Risk assessment is a crucial step of DRM because it helps identify, analyze and evaluate potential hazards and vulnerabilities, enabling more informed decision making to reduce risks.



(d) Explain short & far sightedness.

Short-sightedness and far sightedness are both issues hindering effective sighting through eyes.

i) Short-sightedness (Myopia) is a condition where a person can easily see nearby objects whereas they struggle to view distant objects.

It is caused by eyeball being too long or when cornea is too curved, which causes light to focus in front of retina instead of directly on it.

Correction: Concave lenses or laser surgery

ii) Far sightedness

Hypermetropia is a condition where a person can see distant objects clearly but has difficulty focusing on nearby objects.

It is caused when eyeball is too short, or cornea is too flat, which causes light to focus behind retina instead of directly on it.

Correction: Convex lenses or laser surgery

### QUESTION NO. 5

(a) What is sea surface temperature rise? How does it affect the formation of tropical cyclones?

b) Sea Surface Temperature Rise is the gradual increase in temperature of ocean's surface due to global warming and other factors like increased Green house gas emissions and climate change.

ii) Effect on Formation of Tropical Cyclones

Tropical cyclones are significantly influenced by sea surface area temperatures

- 1) Highest Sea surface temperature leads to increased energy for cyclone formation with more evaporation and moisture
- 2) Enhanced Cyclone Intensity: warmer sea surface temperatures contribute to stronger cyclones with high speeds.
- 3) longer Cyclone Seasons: warmer oceans extend the period of cyclones when sea surface temperatures remain above the threshold
- 4) Impact on Cyclone Traces: they alter circulation patterns of atmosphere causing them to impact regions not traditionally prone to such events.

(b) How does optical fiber work?

i) What is Optical fiber

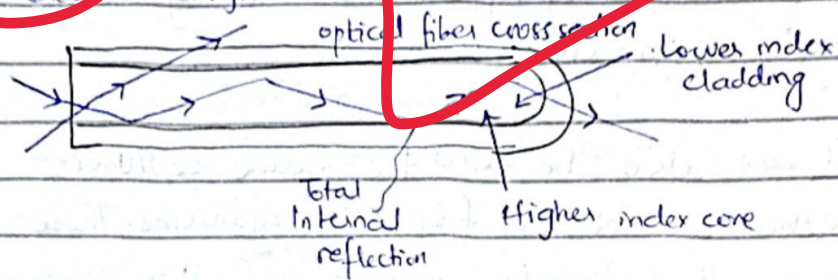
Optical fiber is a thin, flexible strand of glass or plastic that transmits light signals over long distances for communication.

ii) Components

- Core: central thin glass or plastic section where light travels
- Cladding: A layer surrounding the core with a lower refractive index, which keeps the light confined within the core
- Buffer Coating outer protective layer that shields the fiber from physical damage.

iii) Working of Optical Fibers

Optical fiber works by transmitting light signals through a core using total internal reflection. The core's high refractive index keeps light confined, allowing it to carry data as light pulses over long distances with minimal losses. At the receiving end, a photodetector converts the light back into electrical signals.



(c) Discuss different ways in which micro-organisms can help in meeting the current fuel shortage.

Microorganisms can play a crucial role in addressing the current fuel shortage by contributing to the production of biofuels and other alternative energy sources. Below are the ways they can help.

i) Bioethanol Production

They help in bioethanol production which can replace or supplement gasoline, offering a renewable energy source.

ii) Biodiesel Production

Microorganisms can help produce Biodiesel which can replace conventional diesel and is considered a sustainable alternative.

iii) Biogas Production

It can also be used in biogas production

which can be used as renewable fuel for cooking, electricity generation, and even as vehicle fuel.

#### iv) Hydrogen Production

It can be used to produce hydrogen which can be used as a clean fuel for fuel cells and other energy applications, emitting only water vapor when used.

It can also be used to produce cellulosic ethanol and oil from microorganisms. These are all sustainable methods of fuel production.

(d) Briefly describe; Food additives & Food Preservatives.

Food additives and preservatives are used for enhancing food taste and food life.

#### i) Food Additives

Food additives are substances added to food to enhance its flavor, appearance, texture, or nutritional value.

They have many types like flavour enhancers, colorants, emulsifiers and sweeteners.

They are used to improve taste, appearance, consistency, and shelf-life, or provide added nutrients.

## ii) Food Preservatives

They are substances used to prevent spoilage and extend the shelf life of food by inhibiting the growth of microorganisms or slowing down oxidation.

They have many types including natural preservatives (sodium) and chemical preservatives (sodium benzoate, sulfur dioxide).

They are used to prevent food from going bad, maintain quality and reduce waste.

## SECTION B

### QUESTION NO. 7

a) Average of 7 consecutive numbers is 20. Find the largest of these numbers.

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

Average = 20

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

$$7x + (0+1+2+3+4+5+6)$$

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

$$7x + 21 = 140$$

$$7x = 140 - 21$$

$$7x = 140 - 21$$

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

$$x = 17$$

Thus 7 consecutive numbers are: 17, 18, 19, 20, 21, 22, 23

largest number is 23. Ans.

(b) A told B that C is his father's nephew.  
D is A's cousin but not the brother of C.  
What is the relationship between D and C.

Since both C and D are cousins of A, and D is not the brother of C, D and C must be cousins as well.

D and C are cousins. ans.

(c) Find missing numbers in the sequence

(i) 4, 18, 84, 100, 180, 214, 148

(ii) 1, 2, 10, 37, 101, 189

(iii) 11, 17, 39, 85, 163

(iv) 13, 24, 46, 90, 178, 354

(v) 4, 16, 144, 400, 900, 1764

d



③

d) A sum of money to be distributed among A, B, C and D in such that  $A:B = 1:2$ ,  $B:C = 3:2$ ,  $C:D = 3:4$ , if difference in the shares of A and D is 2240, then what is the share of B (in Rs)?

Let A's share be  $x$

B share =  $2x$

$$C \text{ share } \frac{C}{B} = \frac{2}{3} \rightarrow \frac{2}{3} \times 2x = \frac{4x}{3}$$

$$D \text{ share } \frac{D}{C} = \frac{4}{3} \rightarrow \frac{4}{3} \times \frac{4x}{3} = \frac{16x}{9}$$

$$D - A = 2240$$

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

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

$$7x = 20160$$

$$x = \frac{20160}{7} = 2880$$

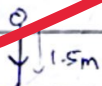
B share =  $2x$

$$2(2880) = \underline{5760} \text{ ans}$$

### QUESTION NO. 8

(a) Ali standing 10 meters away from a tree.

This distance of his eyes from his feet is 1.5 meters. Given that the distance from his eyes to the top of the tree is 15 meters, find the height of the tree.



10m

$$h^2 = 10^2 + 15^2$$

$$h^2 = 100 + 225$$

$$\sqrt{h^2} = \sqrt{325}$$

$$h = 18.03 \text{ meters.}$$

$$h - 1.5 = 18.03 - 1 = 16.53 \text{ meters ans}$$

↓  
height of tree

b) Find out the correct word from the jumbled spellings given below

SONCCUOISIENT

CONSCIENTIOUS

EIVENPRAOST

P

UORSIULDC

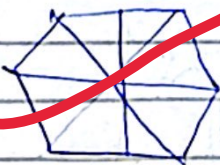
UNSPRESE

SUPRENESS

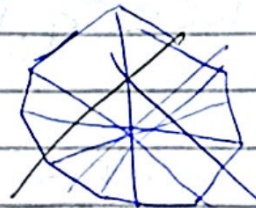
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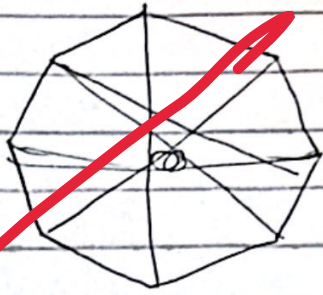
COMPLAIN

(c) Draw and write total number of lines of symmetry in a regular hexagon and octagon. How many lines of symmetry are there in a circle.



Hexagon





Octagon

hexagon has 6.  
Octagon has 8

Circle has infinite number of lines of symmetry.

d)

$$V = \frac{1}{3} \times b \times h$$

$$l = 7$$

$$w = 5 \text{ cm}$$

$$h = 10$$

$$\text{Base area} = 7 \times 5 = 35 \quad \text{L} \times \text{W}$$

$$V = \frac{1}{3} \times 35 \times 10$$

Make headings

Keep length of all questions equal

Draw flow charts and diagrams and properly label it.

Use scientific terminologies

Use scientific examples

The answers are insufficient to fulfill the required criteria of the question and marks

Follow appropriate structure for answer according to the question