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Batch 361

PART-II

(SECTION-A).

Q. No.2

(a)

Difference between Igneous Rocks and Metamorphic Rocks.

Aspect	Igneous Rocks	Metamorphic Rocks
Formation	• Formed by the cooling and solidification of magma or lava.	• Formed by the transformation of existing rocks under heat, pressure, or chemical processes.
Origin	• Primary rocks, formed directly from molten material.	• Secondary rocks, formed from igneous or sedimentary rocks.
Texture	• Often crystalline, with interlocking mineral grains.	• Can be foliated (layered) or non-foliated due to recrystallization.
Examples	• Granite, Basalt	• Marble, Slate

Location	• Found near volcanic regions or deep within the Earth's crust.	• Found in areas of tectonic activity or mountain building.

(b). Explain the phenomenon of Smog and give its Types.

Smog is a type of air pollution that combines smoke and fog. It is caused by the accumulation of pollutants in the atmosphere, such as industrial emissions, vehicular exhaust, and natural atmospheric conditions. Smog forms when these pollutants react with environmental factors like sunlight and moisture.

Key characteristics:

- Reduce Visibility.
- Causes respiratory and health issues
- Harms plants, animals, and buildings.

Types of Smog:

→ 1. Classical smog (Sulfurous Smog):

(a) **Conditions:**

- Forms in cool and humid climates.

(b) **Composition:**

- Contains Sulfur dioxide (SO_2), Particulate

matter, and Water Vapor.

(c) Effects:
- Causes respiratory issues and reduce visibility.

(d) Example:
- London Smog of 1952.

→ 2. Photochemical Smog:

(a) Conditions:
- Occurs in warm, sunny, and dry climates.

(b) Composition:
- Forms due to the reaction of sunlight with nitrogen oxides (NO_x) and hydrocarbons, producing ozone, peroxyacyl nitrates (PANs), and aldehydes.

(c) Effects:
- Causes irritation of eyes, respiratory problems, and damage to plants.

(d) Example:
- Los Angeles Smog

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

Risk Assessment is a critical Component of Disaster Risk Management (DRM) as it helps in Understanding, mitigating, and preparing for potential disasters. Its importance lies in the following aspects:

1. **Identification of Hazards:**
   - Helps in identifying potential hazards (natural or man-made) that may lead to disasters.
   - Allows for a better understanding of the types and causes of risks.

2. **Assessment of Vulnerability:**
   - Analyzes the vulnerability of people, infrastructure, and resources to various hazards.
   - Assists in identifying communities or areas most at risk.

3. **Resource Allocation:**
   - Enables efficient allocation of resources to high-risk areas.
   - Ensures cost-effective strategies by prioritizing mitigation efforts.

4. **Disaster preparedness:**
   - Supports the development of early warning systems and response plans.
   - Enhances preparedness by identifying gaps in current capacities.

5. **Risk Mitigation:**
   - Guides decision-makers in implementing measures to reduce risks (e.g., building codes, land use planning).
   - Focuses on prevention and minimization of potential losses.

6. Community Awareness and Resilience:

- Increase public awareness about potential risks and safety measures.
- Builds resilience by encouraging community participation in risk reduction efforts.

(d) Explain short and far sightedness.

1. Short-Sightedness (Myopia)

Short-Sightedness (myopia) is a very common eye condition where we cannot see objects far away clearly. It's usually corrected with glasses or contact lenses.

a. Symptoms of short-sightedness:

Short sightedness usually starts in children from age 6 to 13. It can also happen in Adults.

Symptoms of child and adults may include:

- Difficulty reading words from a distance, such as reading the white board at school.
- Sitting close to the t.v. or Computer, or holding a mobile phone or tablet close to the face.
- Getting headaches
- Rubbing the eyes a lot.

(b) Causes of short-sightedness:

- Genetics

- Excessive time spent indoors
- Excessive close-vision work (such as working at a computer screen).
- Excessive Eye strain (Caused by watching a bright television screen, for example amblyopia).

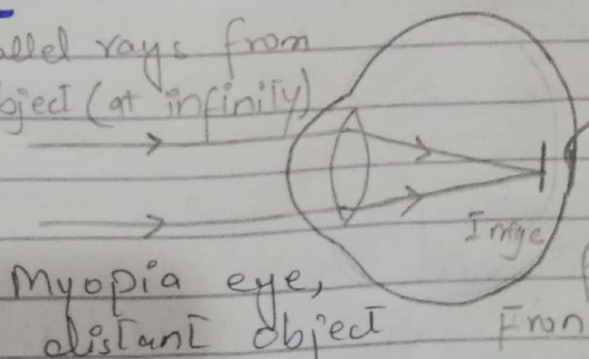
(c) Treatments for short-sightedness:
short sightedness can usually be treated with glasses or contact lenses. These help your eyes focus correctly, so you can see distant objects more clearly.

→ **Laser Eye Surgery and Lens Surgery**

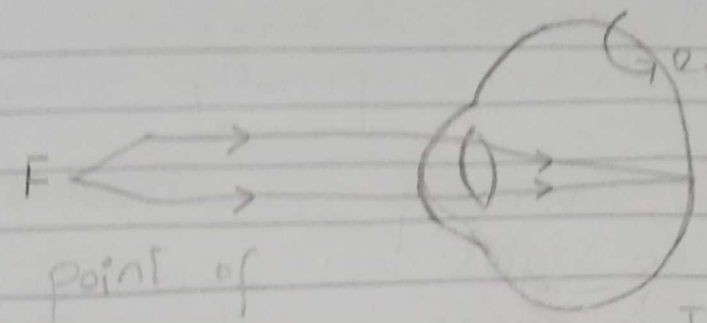
Surgery can be used to improve sight in some adults.
There are two different types of surgery:

- Laser surgery to reshape the front of the eye.
- Lens surgery to replace the lenses in your eyes with artificial lenses.

Diagram:-

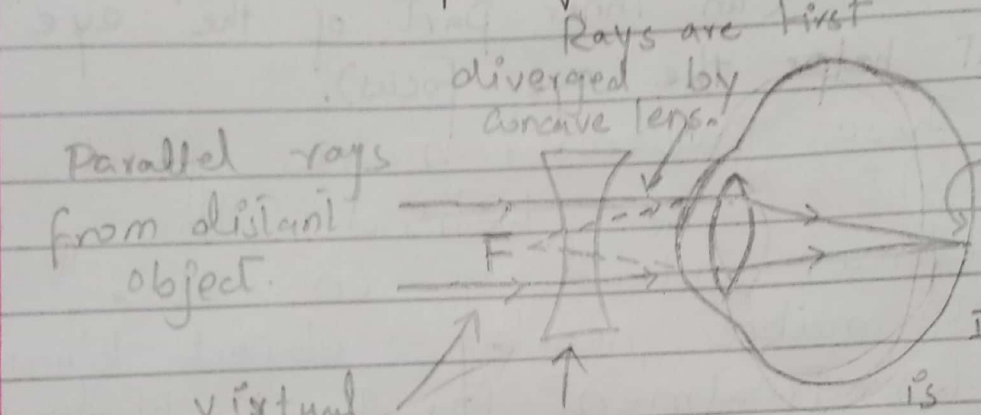


(a) In a myopia eye, image of distant object is formed in front of the retina.



Focal point of this eye

(b) The far point (F) of a myopic eye is less than infinity. Image is formed on the retina.



(c) Correction of myopia. The Concave Lens placed in front of the eye forms a virtual image of distant object at far point (F) of the myopia eye.

2- Far-Sightedness (Hyperopia)

Hyperopia is a Common vision Condition in which you can see distant objects clearly, but objects nearby may be blurry.

(a) Symptoms of Far-Sightedness:

- Trouble seeing things up close.
- Eye Strain (when your eyes

Feel tired or sore).
- Headaches - especially when reading.

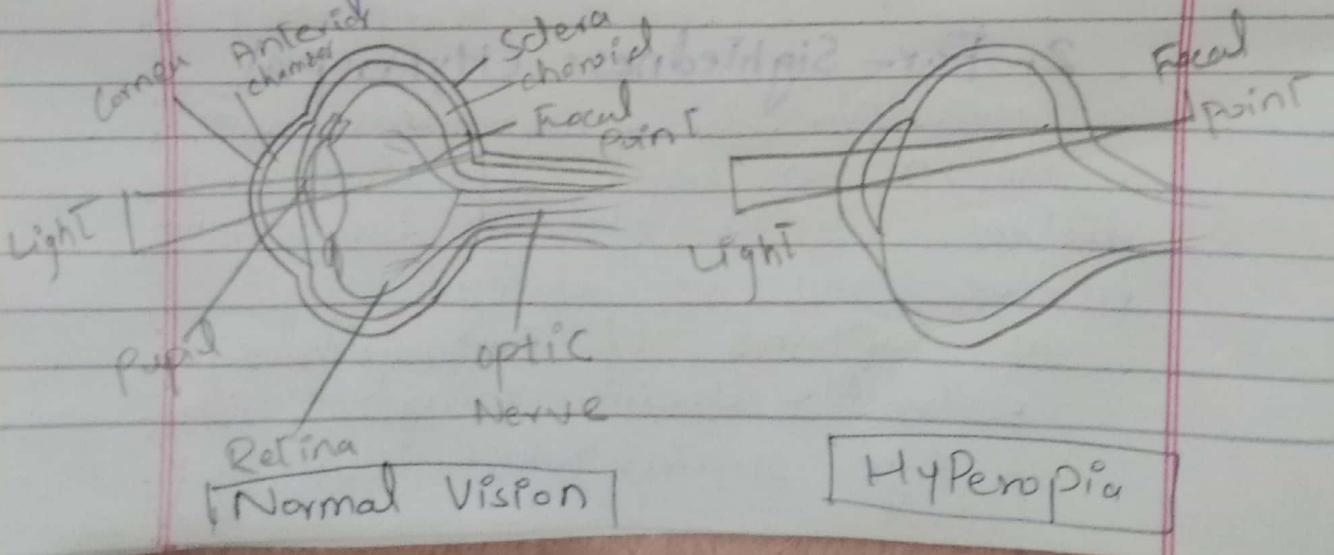
(b) Causes of Far-Sightedness

Far-Sightedness happens when eyeball grows too short from front to back, or when there are problems with the shape of your Cornea (Clear front layer of the eye) or lens (an inner part of the eye that helps the eye focus).

These Problems, make ~~first~~ light focus behind the retina, instead of on it. It makes nearby objects blurry.

(c) Treatment for Far-Sightedness

The most Common treatments for Far-Sightedness are eye-glasses or Contact lenses. Doctors can also use Surgery to treat Far Sightedness in Adults. The Surgery changes the Shape of your Cornea So that it can focus light clearly.



Q. NO.3

(a)

Proteins:

Proteins are Complex molecules made up of amino acids, essential for the structure, function, and regulation of the body's cells, tissues, and organs. Proteins are involved in enzymes, hormones, antibodies, and transport molecules.

1. Digestion of Proteins:

- In the Stomach:

The protein digestion begins with the enzyme pepsin, which breaks proteins down into smaller polypeptides.

- In the small intestine: The pancreas releases trypsin and chymotrypsin enzymes that break down the polypeptides into smaller peptides and amino acids.
- Absorption:

The amino acids are absorbed by the small intestine and transported to the bloodstream for use in building and repairing tissues.

Carbohydrates:

Carbohydrates are organic Compounds made up of Carbon, hydrogen, and oxygen. The Provide a primary energy source

for the body. They are categorized as simple and complex.

1. Digestion of Carbohydrates:

1. In the mouth:

The enzyme salivary amylase begins breaking down starches into simpler sugars.

2. In the stomach:

There is minimal carbohydrates digestion due to the acidic environment.

3. In the intestine:

The pancreas secretes pancreatic amylase to break down starch into maltose, and enzymes like maltase, sucrase, and lactase further break down disaccharides into monosaccharides.

4. Absorption:

The monosaccharides are absorbed by the small intestine and transported to the blood stream, where they are used for energy.

Q: No.3

(b) Atmospheric pressure, Temprature, and Humidity:

- **Atmospheric pressure:**

It is the force exerted by the weight of the atmosphere on a surface. It is measured using

a barometer and decreases with altitude. On Earth's surface, it averages 1013 hPa.

- **Tempreture:** It refers to the degree of heat present in the atmosphere and is measured in Celsius (°C) or Farhenheit. Tempreture affects air density and pressure, with warmer air being less dense, and having lower pressure.

- **Humidity:** It is the amount of water vapor present in the air. It is usually expressed as a percentage. Humidity affects comfort, weather patterns, and precipitation. High humidity can make the air feel warmer and contribute to cloud formation and rainfall.

Q:No:3

(c)

Ephemeron of Earthquake:

An Ephemeron refers to the short-lived nature of certain events or phenomenon. Earthquakes are natural seismic events caused by the movement of tectonic plates beneath the Earth's surface.

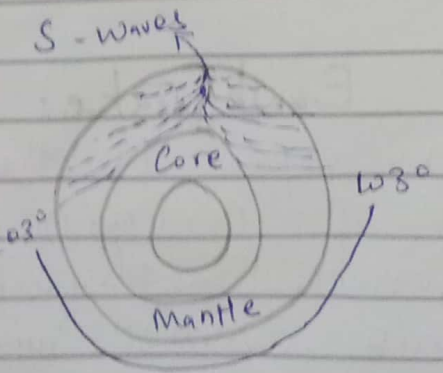
• Causes of Earthquake:

Earthquakes occur when stress builds up between tectonic plates due to their movement, causing a sudden release of energy. This energy travels through the Earth's crust as seismic waves, which we feel as an earthquake.

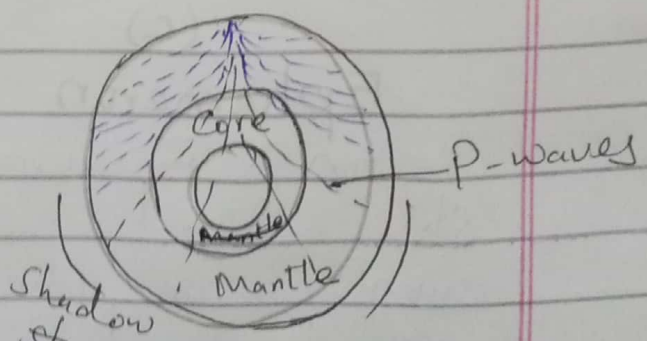
• Types of Seismic Waves:

1. P-waves (primary waves): The fastest seismic waves, which move in a compressional motion.
2. S-waves (secondary waves): Slower than P-waves, they move in a shearing motion.
3. Surface waves: They cause the most damage, moving along the Earth's ~~degree~~ surface.

Diagram:



S wave Shadow Zone - 154°



P-waves that passed through the Core

Q.No.3

d

RADAR (Radio Detection and Ranging) is a system that uses radio waves to detect and locate objects. Here's how it works:

1. **Transmission of Radio Waves:** A RADAR system emits a pulse of radio waves from a transmitter. These waves travel through the air at the speed of light.

2. **Reflection from objects:** when these radio waves encounter an object they bounce off the the object and return to the RADAR receiver.

3. **Reception of Reflected waves:** o RADAR receiver detects the reflected waves. The time taken for the waves to return is measured.

4. **Distance Calculation:**

$$\text{Distance} = \frac{\text{Speed of light} \times \text{Time}}{2}$$

The factor of 2 accounts for the round trip of the signal.

5. **Direction and speed Detection:**

RADAR systems also determine

the direction of the object by using directional antennas.
- By using Doppler effect.

(Section B)

Q. No. 6

(a)

The depreciation is 10% per year, so the price after each year is 90% of the previous year price. We can calculate the price three years ago using the formula:

Price after n years = original price × $(1 - \frac{10}{100})^n$

Current price = 8748

$n = 3$

$8748 = \text{original price} \times (0.9)^3$

$8748 = \text{original price} \times 0.729$

$\text{original price} = \frac{8748}{0.729}$

$\boxed{\text{original price} \approx 12000}$

(b)

$4x + 5 = 3(x + 5)$

$4x + 5 = 3x + 15$

$4x - 3x = 15 - 5$

$\boxed{x = 10}$

So, the daughter is 10 years old now, and the father is

$4x = 40$ years old.

After 10 years, the father's age will be $40 + 10 = 50$ years.

daughter age will be $= 10 + 10 = 20$

$$\frac{50}{20} = 2.5$$

So, after 10 years, the father will be 2.5 times his daughter's age.

(c)

$$V = \frac{4}{3}\pi r^3$$

$\because d = 12\text{ cm}$

$$r = \frac{12}{2} = 6\text{cm}$$

Substitute $r = 6$ into formula

$$V = \frac{4}{3}\pi (6)^3$$

$$V = \frac{4}{3}\pi \times 216$$

$$V = \frac{864\pi}{3}$$

$$V = 288\pi$$

Approximating $\pi = 3.1416$:

$$V \approx 288 \times 3.1416 = \boxed{904.32\text{cm}^3}$$