

27-08-2025

Wednesday

Mock Exam

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RWP OB-069

General Science And Ability

Question # 02

a)

i- Main components of a cell.

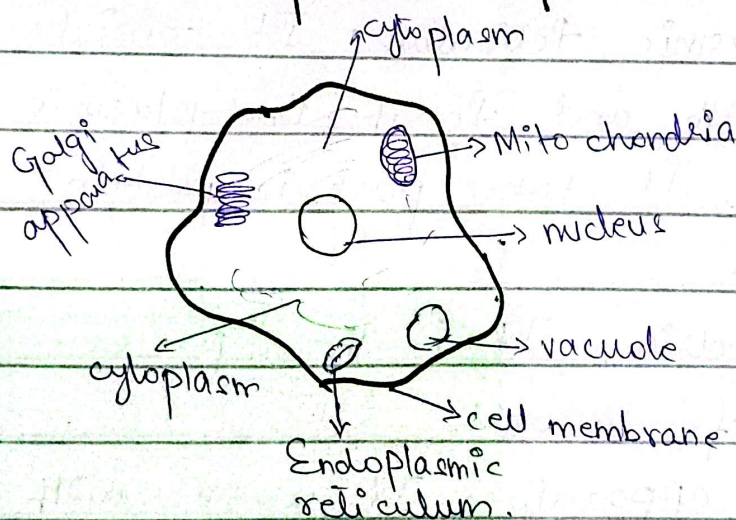


Fig:
Animal cell

Cell is the basic building block of living organisms. The main component of a cell includes

a) Cell membrane: A boundary to support cell organelles and maintain its shape.

b) Nucleus: it contains genetic material i.e. DNA for reproduction

c) Cytoplasm: It is the semi-fluid part of cell which extends from nuclear membrane to cell membrane. It holds the organelles against shock waves.

d) Vacuole: It stores the water in a cell and is called its 'storage house'.

e) Endoplasmic Reticulum: It consists of Smooth and Rough Endoplasmic Reticulum. It takes part in protein synthesis.

f) Mitochondria: It is the 'power house' of a cell.

g) Golgi apparatus: It works with ER to perform protein synthesis

ii- Function

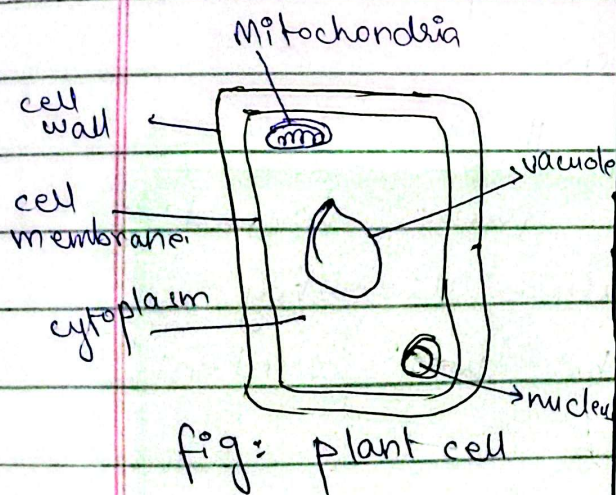
The cellular organelles support each other in these ways:

a) Transport: The wastes and useful products of cell are transported within and outside the cell by cell membrane and cytoplasm.

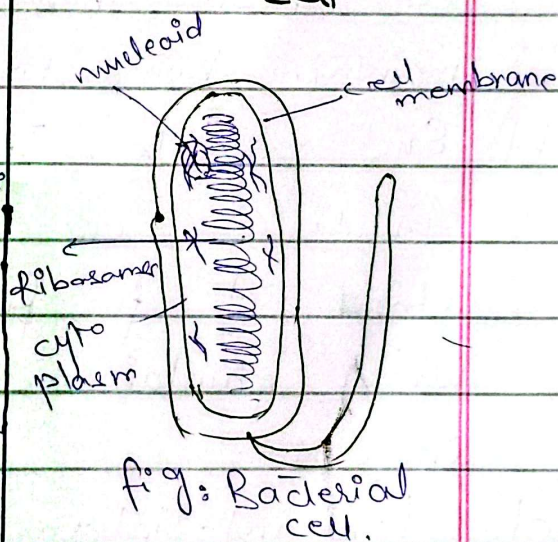
b) Support: Cell membrane and cytoplasm provide support to the cell organelles for function.

c) Correlated functioning: Many organelles perform correlated functions such as ER and Golgi apparatus collectively perform protein synthesis.

iii - Difference Eukaryotic cell



Prokaryotic cell



a) It is present in multi-cellular organism
e.g. animal and plant cell

b) It possesses nucleus

c) It has membrane-bound organelles

a) It is present in unicellular organisms
e.g. bacteria, fungi

b) It does not possess nucleus

c) It lacks membrane-bound organelles

Qiv- How cell maintain homeostasis.

The term 'homeostasis' refers to the 'maintenance of equilibrium environment in cell'. The cells respond to external stimuli and maintain homeostasis in following ways:

a) Shock-resistance: In case of interaction with shock waves, cell membrane decreases the impact by supporting cell organelles and cytoplasm holds them in place to maintain homeostasis.

b) Excess Water: If the external stimuli is 'excess water', vacuole store it for future use by which maintains the water content in cell.

c) Toxicants interaction: Upon interaction with toxicants, cell membrane serve as semi-permeable membrane and do not allow them to pollute cell environment.

These are some of the ways by which cell maintains homeostasis.

2)

b1 Mobile Phones

ii Working and key technologies of mobile phone.

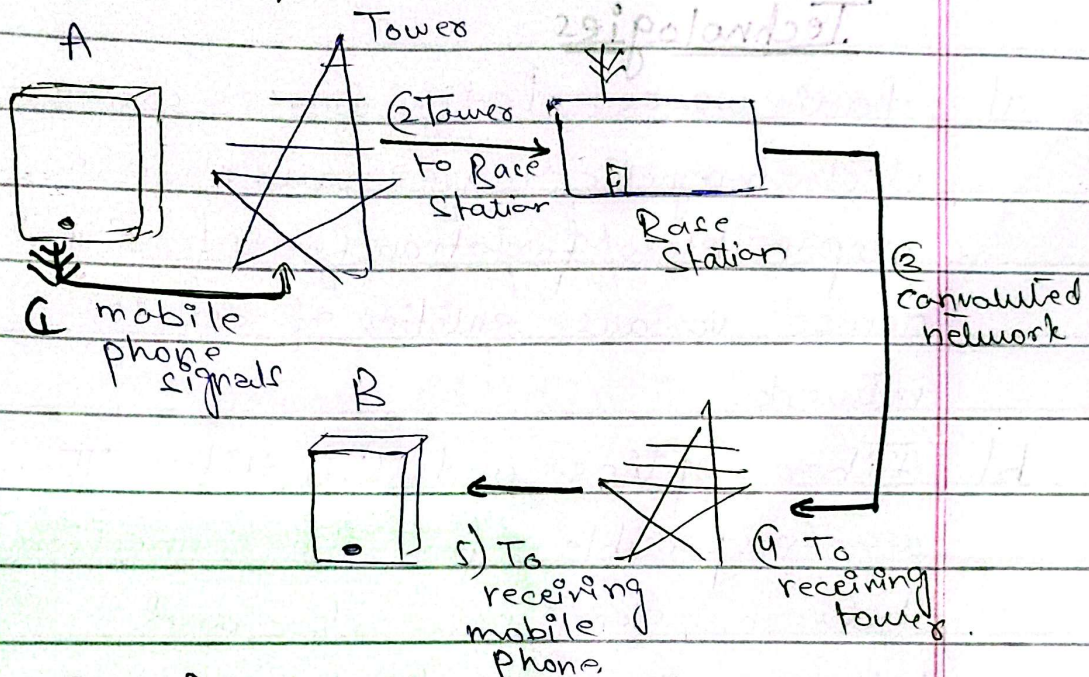


fig: Block diagram of mobile phone.

Working

- a) The mobile transmitter transmits the signals to nearby tower.
- b) The tower transmits them to a nearby base station.
- c) Base station transmits the signal to receive end tower in the form of convoluted network.

a) The receiving tower transmits the signal to the receiver of mobile phone which converts the signal to sound, graphics as per need of original signal.

Technologies

a) Radio waves: Radio waves are electromagnetic waves which are responsible for transfer of signal across various entities of cellular network.

b) Fiber optics and Satellites: They are responsible for the connection between core network and telecommunication infrastructure in land and space.

c) 4G / 5G technologies: In old times, circuits were used for data transfer. Nowadays, packet switching is used to convert large videos, sounds etc into small data packets. They are transferred at long distances with high efficiency.

ii. Advantages of Mobile phone:

- a) They facilitate long-distance communication e.g. America to Pakistan.
- b) They provide access over large amount of information by servers like Google, Yahoo etc.
- c) They are key actors in advancing Globalization e.g. by social media.

Disadvantages of Mobile Phone:

- a) A Howard study reveals that mobile phone addiction is increasing in youth due to the dopamine hit stimulated by binge watching apps. The increased addiction to screen has decreased the connectivity with peers. It ultimately results in the loss of social interaction.
- b) More screen time means lesser the physical activity. The loss of social interaction and disturbance of sleep cycle results in the degradation of mental health.

iii) Mobile phones have revolutionized the communication and information domain.

a) The video and audio call, whatsapp, facebook and other social media apps in mobile phone have widely enhanced the connectivity.

One can connect with anyone across the globe.

b) The access to information has drastically enhanced. A few decades ago, information was sought in libraries. However, it is just one click away in modern world. The world has become a global village.

Even, in the COVID-19 pandemic, mobile phone had connected and informed whole world. It even substituted educational institutes in developing countries like Pakistan.

So mobile phone has revolutionized and advanced the world towards globalization.

il Different layers of Earth.

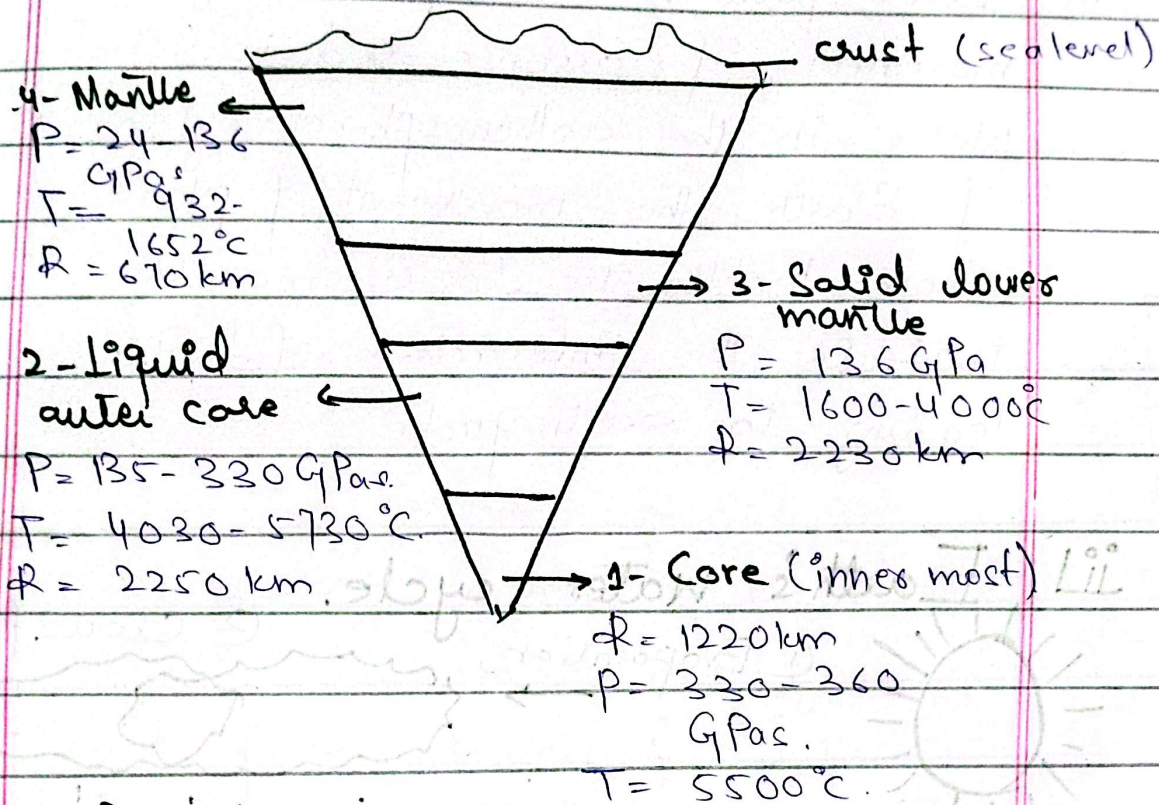


fig: Layers of Earth.

1. How do they interact with each other?

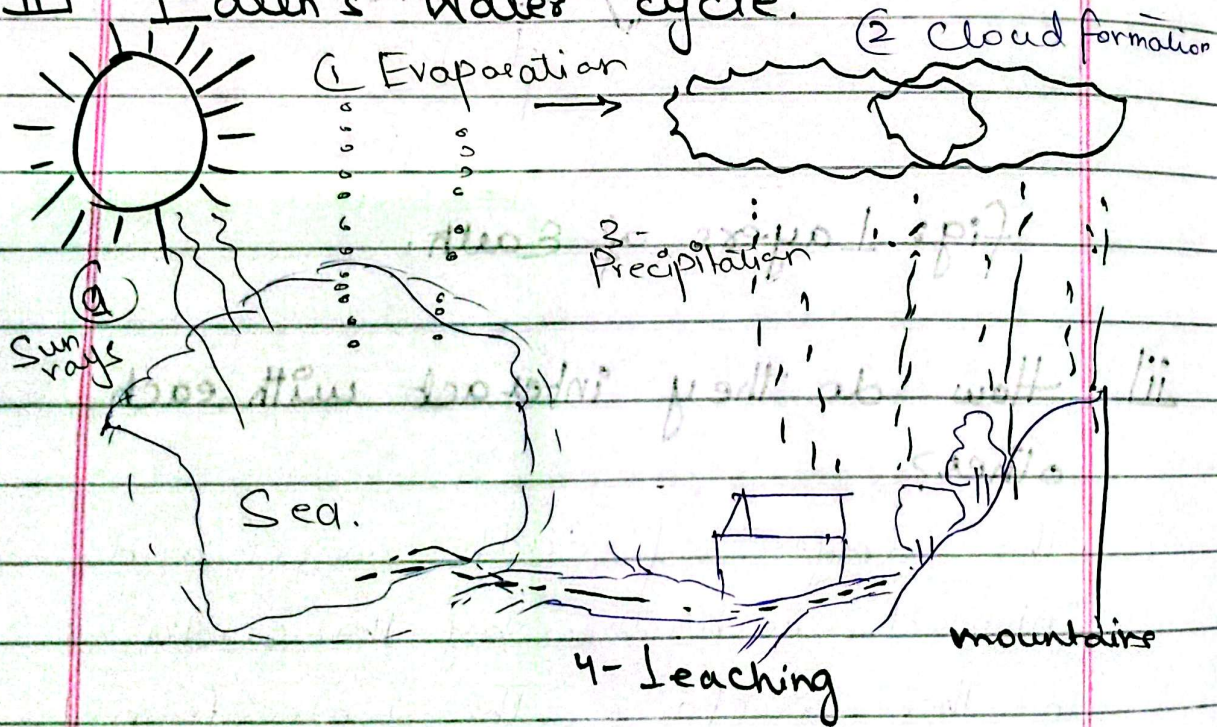
The layers of Earth connect and interact each other by the cracks in their surfaces. The water from crust may enter mantle by these cracks.

Volcanic eruption is the result of magma leaching out of the crust from core. It travels across

the layers by cracks and burst as volcanic eruptions.

b) Earth quakes takes place by movement of oceanic and terrestrial plates in the asthenosphere region of Earth. The movement of plate from mantle to lower mantle indicates the interaction of layers leading to Earth quake.

ii) Earth's water cycle.



Water cycle is the process by which water content of Earth is maintained. The water leaving the Earth is equal to the

amount of water reaching Earth.
Following processes are involved
in Earth's water cycle.

a) Evaporation: The heat from
sunlight enhances the kinetic
energy of water molecules in
water body. As a result, evaporation
takes place.

b) Cloud formation: As the water
molecules move upward in
troposphere, temperature decreases.
As a result, molecules gather
and form clouds.

c) Precipitation: When the clouds
become heavy, molecules begin
to fall in the form of rain, hail,
snow etc.

d) Leaching: The precipitated water
reach back to the sea through
canals, rivers and lakes. It may
also be stored as groundwater
and glacier.

The ~~main~~ water cycle provides:

- a) Fresh water for the drinking purpose and sustenance of life.
- b) Rain is the major source of irrigation, as in Pakistan.

So, agriculture is directly dependent on rain and life would not sustain without rain. Its absence may lead to food scarcity, water scarcity, drought and ultimately the death of life.

iii Human activities.

Earth's ecosystem and natural resources are affected by human activities as follows:

- a) Deforestation:

It leads to the loss of biodiversity and carbon sinks. As a result, natural wildlife and atmosphere of Earth are negatively impacted.

- b) Burning of fossil fuels: Massive combustion has led to the

u)

atmospheric pollution and depletion of natural fossil fuels reserves.

c) Industrialization:

The wastes of industries are disposed in water bodies leading the death of marine life and water pollution. It also cause air pollution by smoke.

d)

i) Air Pollution:

It denotes The presence of harmful substances in air which degrades its quality.

Sources:

a) Fossil fuel combustion:

The combustion of fossil fuel add large amount of carbon dioxide and sulphur dioxide in atmosphere. It causes air pollution.

a) Green House Gases Emission.

From industries to transport, every sector is responsible for

the emission of GHGs including Carbon dioxide, Methane, Nitrogen oxide etc. They all serve as air pollutants.



d-1 Air Pollution

i) Main sources and effects.

a) Carbon dioxide: primary pollutant.

Sources:

- I Fossil fuel combustion
- II Deforestation
- III industries.

Effects.

- I Enhance the trapping of sunlight in atmosphere which leads to global warming
- II It leads to The lung cancer in humans.

b) Methane

Sources.

- I Fossil fuel combustion
- II Burning of bio fuel

Effects

- I enhances the green house effect

in atmosphere.

- II It may cause toxification in human health.

3- Ozone

Sources

- I Green House effect cause ozone formation in atmosphere by trapping sunlight.

- II Sunlight converts O_2 into O_3 .
Effect.

- I Pollute air leading to phenomenon like acid rain

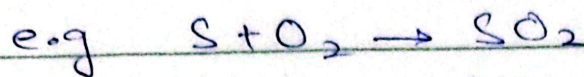
- II Carcinogen

ii- Primary air pollutant:

The ~~nature~~ original pollutants whose high concentration leading to the air pollution are called primary air pollutant.
e.g.: CO_2 , S, CH_4 etc.

Secondary air pollutant:

These pollutants are derived from primary air pollutants.



iii) Efforts to reduce air pollution:

I - Individual Efforts.

a) Reforestation: Plant trees to enhance carbon sinks.

b) Spread awareness: Spread awareness in surroundings about air pollution harms by speech, literature and social interaction.

II - Collective Efforts

a) Shift to renewable energy resources.

Fossil fuels are major source of air pollution. So, they should be replaced by renewable energy resources.

b) Use of public transport: Instead of individual transport, promote public transport to decrease the addition of pollutants in air.

Question No. 4

a

i) Fiber optics:

They are glass fibers used to transfer information over long distances.

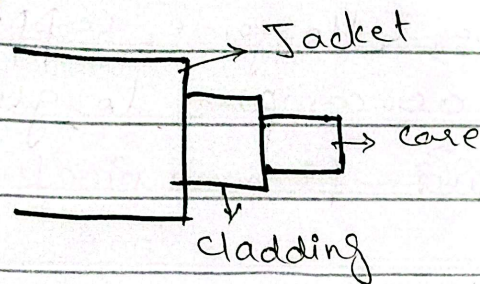


fig: Fiber optic cable.

Working:

a) Total Internal Reflection.

- I- The light is introduced into core.
- II - Refractive index of core is higher than cladding.
- III Resultantly, light bends within the core with minimum attenuation.

This is called 'Total internal Reflection'.

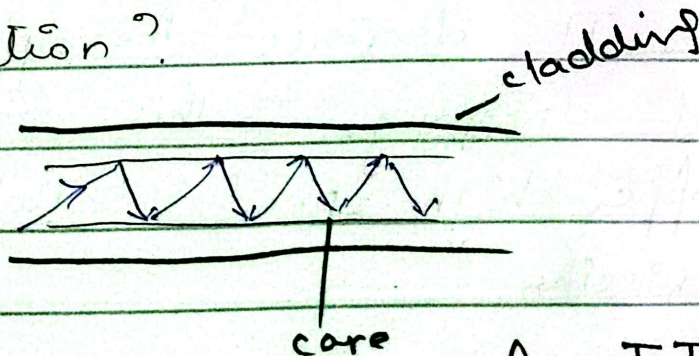


fig: TIR.

iii) Advantages:

a) Size: Smaller size of optic fiber advents it above traditional copper wires in communication.

b) Cost: Due to small size, optic fiber communication becomes cost-effective. Alongside, copper is expensive as compare to glass. So, copper wire communication is expensive.

c) Efficiency: Due to small size and total internal reflection, signal's quality is improved. Whereas, copper wire communication causes signal dispersion leading to in efficiency.

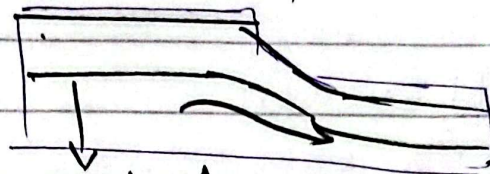
iv) High-speed data transmission

is possible due to minimum attenuation and maintenance of total internal reflection in fiber optics. It decreases the pace of signal damping. In this way, it offer high-speed data transmission.

b | Earthquake

i | Causes of Earthquake

a | Movement of tectonic plates may lead to Earthquake.



lead to earthquake.

b | Volcanic activity may lead to Earthquake.

c | Accumulation of water by cracks into rocks of water beds cause strain. Beyond the strain limit, rocks may crack and displace causing earthquake.

Effects.

a | Human loss:

It cause deaths at large scale.

In 2005 Earthquake, thousands of people died in Pakistan.

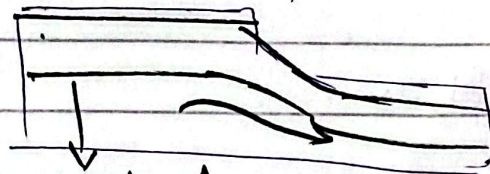
b | Infrastructure loss:

The loss of buildings including hospitals, schools and offices collapse.

b | Earthquake

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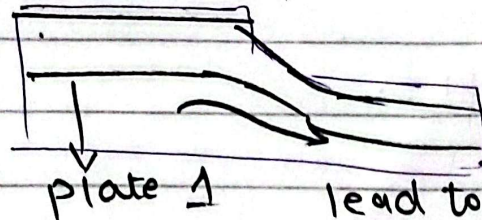
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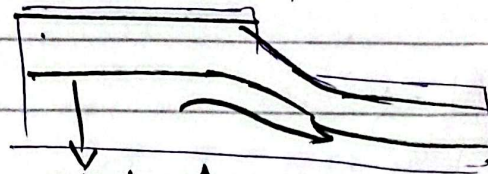
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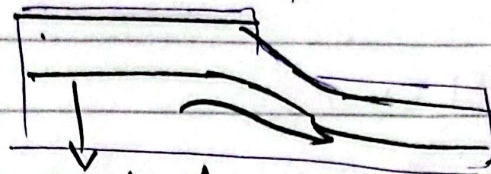
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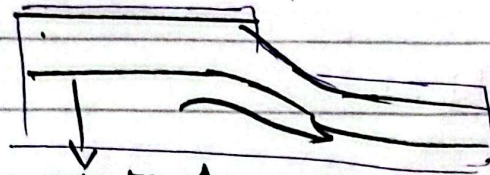
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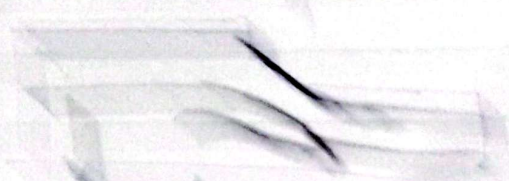
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The diagram shows a cross-section of the Earth's crust. The upper part is labeled 'Crust' and the lower part is labeled 'Mantle'. A line representing a fault is shown dipping to the right. Arrows indicate the direction of movement along the fault.



This is a normal fault.

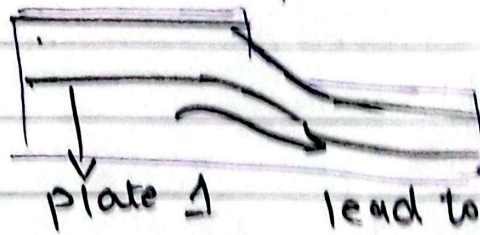
In a normal fault, the upper block moves down relative to the lower block. This occurs because the crust is being pulled apart, causing it to thin. The fault line is called a normal fault because it follows the normal direction of stress in the crust.

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1. The first part of the text discusses the importance of maintaining accurate records of all transactions, including sales, purchases, and expenses. It emphasizes the need for consistency and thoroughness in record-keeping to ensure the reliability of financial data.

2. The second part of the text focuses on the importance of regular reconciliation of accounts. It explains how reconciling accounts helps identify discrepancies, correct errors, and ensure that the books are balanced. This process is crucial for maintaining the integrity of the financial statements.

3. The third part of the text discusses the importance of proper classification of transactions. It highlights the need to categorize transactions correctly according to the accounting system, ensuring that they are recorded in the appropriate accounts. This step is essential for accurate financial reporting.

4. The fourth part of the text addresses the importance of timely recording of transactions. It stresses that delays in recording can lead to inaccuracies and may affect the timeliness of financial statements. Prompt recording is key to maintaining up-to-date financial records.

5. The fifth part of the text discusses the importance of proper documentation of transactions. It notes that supporting documents, such as invoices, receipts, and contracts, are essential for verifying the accuracy of the recorded transactions. Proper documentation provides a clear audit trail.

6. The sixth part of the text focuses on the importance of regular backups of financial data. It explains that backing up data regularly helps protect against data loss due to hardware failures, software issues, or other unforeseen circumstances. Regular backups ensure that financial records are secure and recoverable.

7. The seventh part of the text discusses the importance of proper storage of financial records. It highlights the need to store records in a secure, organized manner, both physically and electronically. Proper storage ensures that records are easily accessible when needed for review or audit.

8. The eighth part of the text addresses the importance of regular reviews of financial records. It explains that periodic reviews help identify trends, detect potential issues, and ensure that the financial system is operating efficiently. Regular reviews are a key component of effective financial management.

9. The ninth part of the text discusses the importance of proper handling of sensitive financial information. It emphasizes the need to implement strong security measures to protect financial data from unauthorized access, theft, or disclosure. Proper handling of sensitive information is critical for maintaining confidentiality and trust.

10. The tenth part of the text focuses on the importance of proper disposal of financial records. It explains that records should be disposed of securely and in accordance with applicable laws and regulations. Proper disposal ensures that sensitive financial information is not inadvertently released or destroyed.



[Faint handwritten text]

The image is extremely blurry, showing horizontal bands of indistinct colors (pink, green, grey) that suggest the presence of text or a table, but no specific content is legible.

1. I have been
 2. very much interested in the
 3. last few days of the
 4. people who are

... and ...

c) Floods.

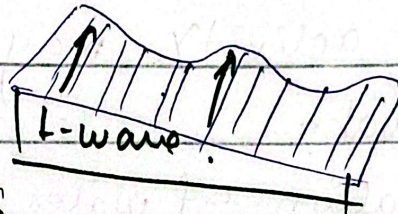
Earthquake by river body may cause floods.

ii) Seismic waves

Types

a) Surface / L-waves:

They travel along Earth's crust surface



b) Body waves

They travel through Earth's interior surface.

It has two types.

P-waves.



Body waves.

They move material in parallel path and travel through liquid.

S-waves

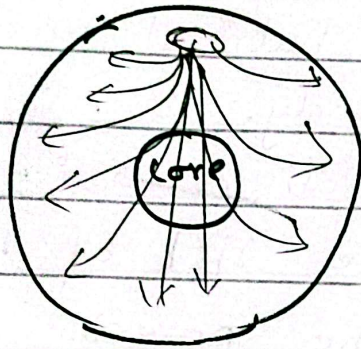
They move object at right direction to their motion. They do not propagate through liquid medium.

Measurement:

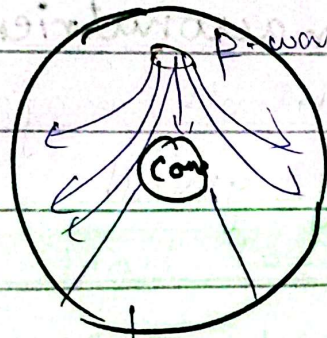
They are measured through seismograph.

- a) S-waves don't reach opposite hemisphere
- b) P-waves reach there..

P-wave.



S-wave.



Shadow zone,

iii) Earth quake-resistant measures, construction & preparedness may

a) save human life by early evacuation.

b) Sustenance of important infrastructure we may save economy.

c) Floods-resistant measures can be timely taken.

i) Balanced Diet.

It is the diet which contains balanced portions of all necessary nutrients.

Importance:

- a) It fulfills the nutrient and energy need of body.
- b) It keeps metabolism active
- c) It decreases the risk of disease
- d) It enhances immune power.

ii) Importance of macronutrients.

They are the nutrients majorly required for body growth.

a) Carbohydrates

They are necessary to provide glucose to the body. It fulfill the energy content of body. Its deficiency may lead to loss of energy and diseases.

b) Proteins

They are essential for the growth of muscles, hair, nails etc. Their

deficiency. may lead to muscle loss.

c) Fats / Lipids.

They store energy in the body for future need. A balanced amount of fat is required to avoid obesity.

Importance of micronutrients.

a) Minerals

They include Calcium, sodium, fluoride, iron etc in minor quantity to sustain life.

I- Calcium is necessary for bones and teeth, as its deficiency may lead to osteoporosis.

II- Sodium is a crucial micronutrient for blood regulation. However, its high quantity may lead to blood pressure issues.

III Iron is necessary part of haemoglobin. Its absence may lead to anemia.

b) Vitamins

They include fat and ^{water} soluble vitamins. They are taken in adequate amount to sustain health.

- I. Vitamin A is necessary in diet to avoid blindness
- II. Vitamin D is necessary for strength of bones
- III. Vitamin C regulates the body's functioning

These high amount may lead to headache, and toxicity.

→ So,

it can be said that all macro and micro nutrients should be taken in balanced quantity to avoid chronic diseases including blood pressure, anemia, osteoporosis etc.

2) Water Pollution

i) Sources

a) Physical pollutants.

They include solid wastes such as wood, leather etc. Their disposal in water may pollute it.

Effect: They degrade the aesthetic impact of water and cause choking of seabed. Soil may choke fish gills.

b) Chemical pollutants.

They include chemical wastes of industries, medicine etc. disposed off in water.

Effect:

They may increase the pH of water, turning it acidic.

It ultimately leads to the death of water life.

c) Radioactive pollutants

Nuclear power plants are built near water bodies. Their waste is disposed in water causing radioactive activity in water.

Effect:

It destroys the cells of Marine life, causing mutations in next generation and death of existing generation.

ii) Impact

a) Human Health.

- I The polluted water used for drinking and cooking is consumed by human beings.
- II It causes the dysfunctioning of stomach and kidney due to high pH and harmful pollutants.
- III Radioactive water can cause cancer in human beings.

b) Environment

- I- It may decrease aesthetic of environment.
- II Polluted water, when used for agriculture, can contaminate soil.
- III - The water cycle would continue from this polluted water, which may lead to acid rain.

iii- Control and Prevention.

a) Waste-disposal Strategy

From agriculture to industries and solid waste, the filters and dumping strategies should be developed to save water.

b) Binding policies

Inter and intra government binding policies should be developed to save water. In the case of violation, heavy sanctions should be imposed.

c) Awareness

In Pakistan alone, more than 50% population dispose waste in water (Dawn).

The awareness with the deterrence of punishment should be spread to save water bodies and marine life.

Q#7.
a)

ten's digit = x

unit digit = y

Eq #1

$$y = x + 2$$

Eq #2.

$$xy + (x + y) = 144$$

Put eq (1) in (2)

$$x(x + 2) + x + (x + 2) = 144$$

$$x^2 + 2x + 2x + 2 = 144$$

$$x^2 + 4x + 2 = 144$$

$$x^2 + 2x + 2x + 2 = 144$$

$$x(x + 2) + 2(x + 2) = 144$$

$$(x + 2)^2 = 144$$

$$\sqrt{x + 2} = \sqrt{144}$$

$$x + 2 = 12$$

$$\boxed{x = 10}$$

put in eq (2).

$$y = 10 + 2 = 12$$

→ So unit's number = 12 ; exceeds
ten's number $x = 2$ by 2

2)

b)

Missing numbers.

i- 53, 53, 40, 40, 27, 27, 14, 14

ii- 14, 28, 20, 40, 32, 64, 56

iii- 8, 6, 9, 23, 87, 43

iv- B, F, E, B

v- V, U, W, V, X, W, X

d)Father's age = x Son's age = y

$$x - 10 = 3(y - 10)$$

$$x + 10 = 2(y + 10)$$

$$\rightarrow x - 10 = 3y - 30$$

$$x + 10 = 2y + 20$$

$$x - 3y = -20 \rightarrow (i)$$

$$x - 2y = 10 \rightarrow (ii)$$

$$\boxed{x = 10 + 2y} \rightarrow (iii)$$

From (i) and (ii)

$$2x - 5y = -10$$

put (iii)

$$2(10+2y) - 5y = -10$$

$$20 + 4y - 5y = -10$$

$$-y = -10 - 20$$

$$\boxed{y = 30}$$

put in (ii)

$$x - 2(30) = 10$$

$$x - 60 = 10$$

$$\boxed{x = 70}$$

Father's age = 70

Son's age = 30