

NOTE:

- i. **Part-II is to be attempted on the separate Answer Book.**
- ii. **Attempt ONLY FOUR questions from PART-II by selecting TWO questions from EACH SECTION. ALL questions carry EQUAL marks.**

PART-II
SECTION-I

Q. No. 2

- a. What are the main components of a cell, and how do they work together to maintain cellular functions? Discuss the differences between prokaryotic and eukaryotic cells. How do cells respond to external stimuli and maintain homeostasis?
- b. How do mobile phones work, and what are the key technologies that enable mobile communication? Discuss the advantages and disadvantages of mobile phone use, including impacts on social interactions and mental health. How have mobile phones changed the way we communicate and access information?
- c. What are the different layers of the Earth, and how do they interact with each other? Discuss the Earth's water cycle and how it supports life on our planet. How do human activities impact the Earth's ecosystems and natural resources?
- d. What are the main sources and effects of air pollution, and how do they impact human health and the environment? Discuss the differences between primary and secondary air pollutants. How can we reduce air pollution through individual and collective actions?

Q. No. 3

- a. What is the Big Bang theory, and how does it explain the origin and evolution of the universe? Discuss the role of dark matter and dark energy in the universe's expansion. What are some of the key evidence supporting the Big Bang theory?
- b. What is a galaxy, and how are galaxies classified? Describe the structure and composition of the Milky Way galaxy. How do galaxies form and evolve over time?
- c. What is remote sensing, and how is it used in Earth observation? Discuss the different types of remote sensing technologies, such as satellite imaging and aerial photography. How can remote sensing be used to monitor environmental changes and natural disasters?
- d. What are the main functions of the human brain, and how do different brain regions work together? How can brain function be affected by factors such as sleep, nutrition, and stress?

Q. No. 4

- a. What are fiber optics, and how do they work? Discuss the advantages of fiber optic communication over traditional copper wire communication. How do fiber optics enable high-speed data transmission?
- b. What are the causes and effects of earthquakes? Describe the different types of seismic waves and how they are measured. How can earthquake-resistant construction and preparedness measures reduce the impact of earthquakes?
- c. What is a balanced diet, and why is it essential for maintaining good health? Discuss the importance of macronutrients and micronutrients in a balanced diet. How can a balanced diet help prevent chronic diseases?
- d. What are the main sources and effects of water pollution? Discuss the impact of water pollution on

human health and the environment. How can we prevent and control water pollution in our communities?

Date: _____ Day: _____

①
QUESTION: 2
ANSWER

Part "a"

CELL:

"Cell is the basic structural and functional unit of living organisms."

Components of Cell :

① Cell Wall:

It is the outermost membrane of plant cell.

It has three types:

(a) Primary cell wall:

It is the inner wall and elastic

(b) Secondary cell wall:

It is the outermost wall and rigid in structure.

(c) Middle lamella:

It glue together different cell.

Function of Cell wall:

Cell wall helps in the protection of cell and maintain the shape of a cell.

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② Cell Membrane:

It is the semi permeable membrane and helps in the selective transport of nutrients across membrane.

③ Nucleus:

Nucleus acts as the brain of a cell and it controls all the functions of a cell and has genetic material in the form of DNA.

④ Endoplasmic Reticulum:

It is a folded structures called cisternae which extend from nucleus towards cell membrane.

It has two types

① Smooth Endoplasmic Reticulum:

It helps in fat synthesis

② Rough Endoplasmic reticulum:

It helps in protein synthesis

⑤ Golgi Bodies:

These are folded

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structures which help in the modification of proteins.

⑥ Mitochondria:

It is a self replication, double membrane bounded organelle. It is a power house of the cell.

⑦ Lysosome:

It helps in the digestion and removal of wastes from the cell.

⑧ Plastid:

It has three types:

① Chloroplast:

It helps in photosynthesis.

② Chromoplast:

It gives colours to petals and fruits.

③ Leucoplast:

It helps in the storage of food in underground part of the plant i.e. root.

⑨ Ribosomes:

These are present in cytoplasm and help

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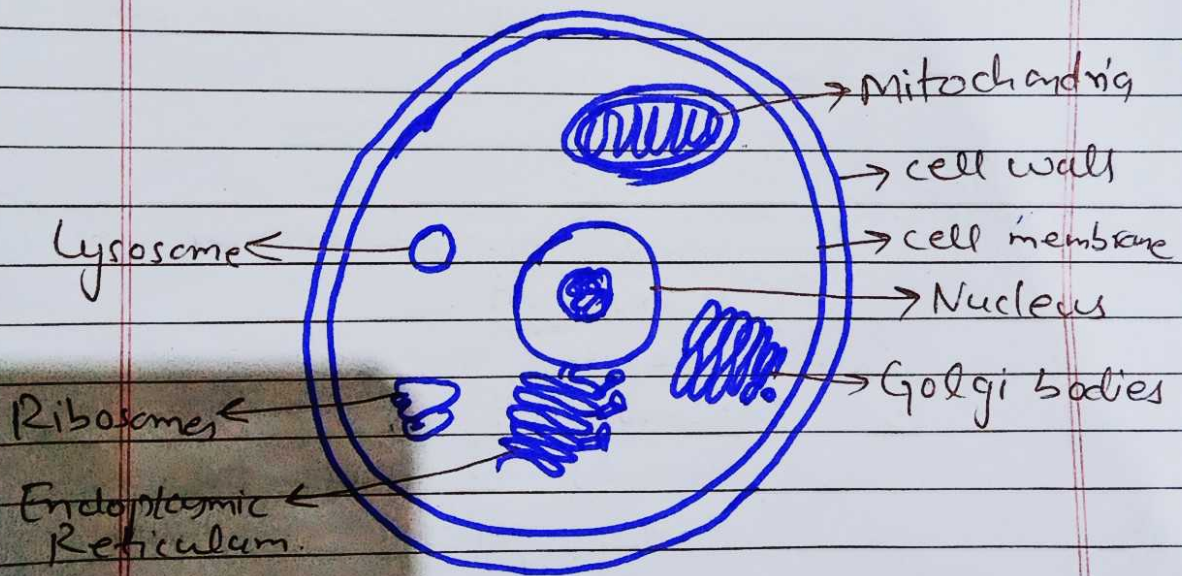
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in protein synthesis

10 - Cytoplasm:

It is a semi-liquid structure present between nucleus and cell membrane. All metabolic activities occurs in the cytoplasm.

Diagrammatically:



Structure
of Cell.

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Difference b/w Prokaryotic and Eukaryotic cell:

Prokaryotic cell

Eukaryotic cell

1 → It does not have true nucleus.

It has true nucleus.

2 → Membrane bounded organelles are absent

Membrane bounded organelles are present.

3 → It is present in unicellular organisms

It is present in multicellular complex organisms.

4 → Cell wall is made of murein

Cell wall is made up of cellulose

Example: bacteria

Example: Plant and animal cells

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⑥ Response of cell to external stimuli:

Cell response to external stimuli in efficient way. Whenever there is a need of water and nutrients to the cell. It allows them to enter through cell membrane. Moreover, cells have certain receptors on their membranes which prevent harmful substances from entering cell.

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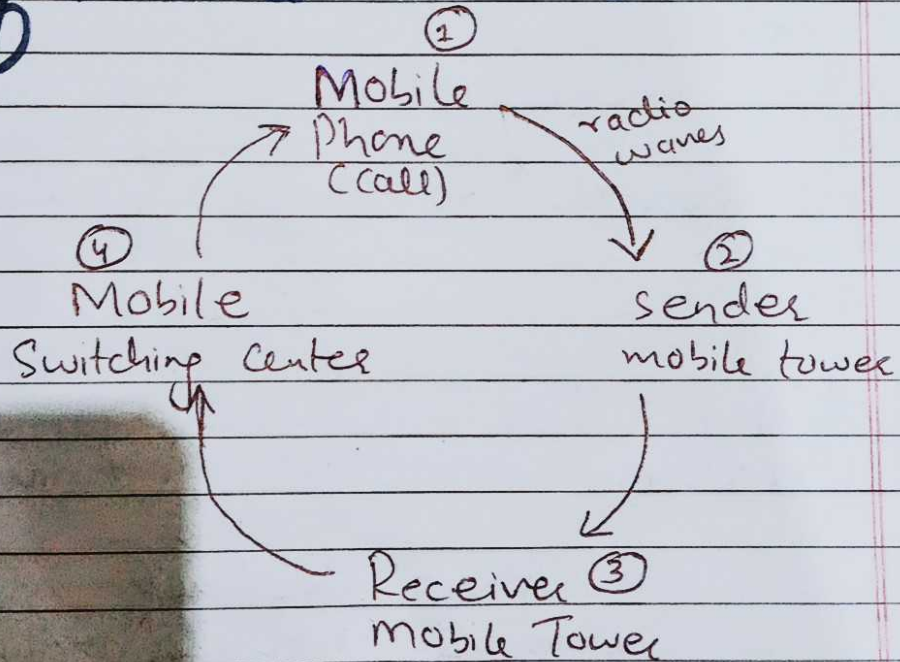
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Part 'b'
ANSWER:

Mobile Phones:

"These are telecommunication devices which helps in the transfer of messages through radio waves."

Working Phenomenon of mobile Phones



Mobile phone convert voice into electrical signals in the form of radio waves. Mobile antenna can not transfer message directly

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to receiver. Therefore, the signals are first transfer to sender mobile tower which then transfer it to receiver mobile tower. The receiver mobile tower further send to mobile switching center (Detail of the SIM holder). From the mobile switching center radio waves are transfer to the cell phone of receiver and the mobile microphone convert it into sound waves. As a result, message is transfer from one person to another in the form of voice.

Key Technologies that Enable mobile Communication

The key technologies that enable mobile communication include:

- ① WhatsApp
- ② Instagram
- ③ Facebook etc.

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⑤ Advantages of Mobile Phones:

- ① **Ease of Communication:**
Mobile phones have resulted in the ease of communication.
- ② **Access to knowledge:**
Knowledge is easily accessible through mobile phones.
- ③ **Source of Entertainment:**
Mobile phone is also a source of entertainment as dramas can be watched on it.

Disadvantages of Mobile Phones:

- ① **Lack of Communication with close people:**
Mobile phones have reconnected us with people sitting miles apart. However, it has created a gap in communication with close family members.

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② Wastage of Time

Mobile phones consumed a lot of our time. As a result, we are distracted from important work.

③ Mental health Affects:

Too much consumption of mobile phones lead to mental issues like anxiety and depression.

Mobile Phones revolutionized Communication and access Information.

Mobiles phones have revolutionized the way people communicate. Now, a message can be sent within seconds. Moreover, it has provided humans access to important information from around the world.

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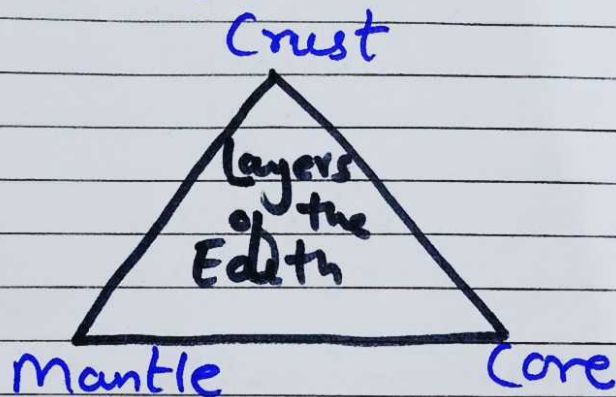
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Page:

Part "c"
ANSWER:

Layers of Earth

The total radius of the Earth is 6400 km. It is further divided into three layers.



① Crust:

It is the outermost part of the Earth. It is divided into two types.

⑥ Oceanic Crust (5-10 km)

⑦ Continental Crust (20-70 km)

Oceanic crust is more denser than continental crust.

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② Mantle: ¹²

It is present below crust. Its total length is 2500 km. It has two types

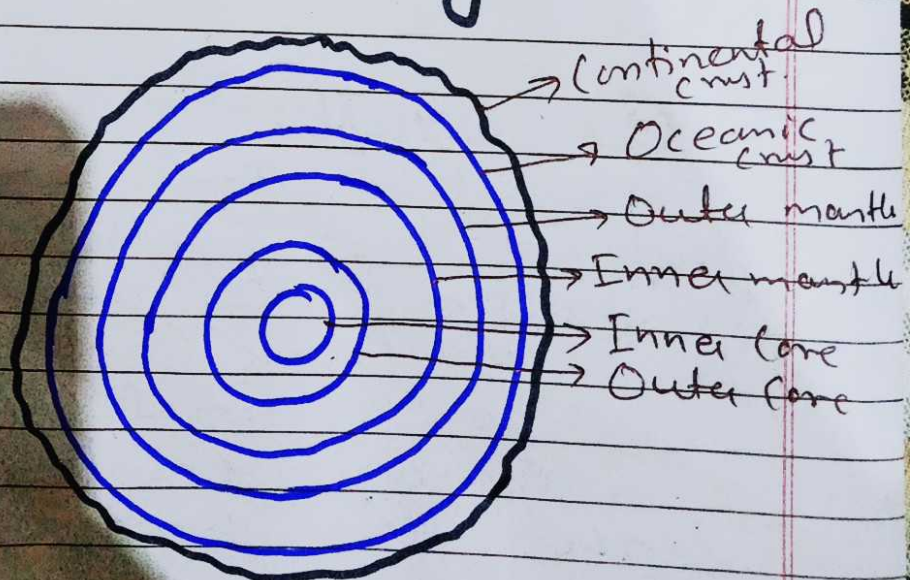
- ④ Upper mantle
- ⑤ Inner mantle

③ Core:

It is the innermost part of the earth. Its length is 3600 km. It is divided into two types.

- ④ Outer core
- ⑤ Inner core

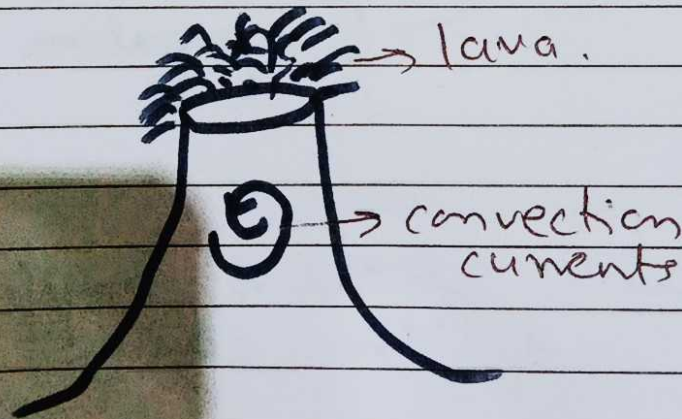
Diagrammatically



Structure of the Earth:

INTERACTION OF DIFFERENT LAYERS OF THE EARTH:

On the outer mantle magma is formed from the molten rocks. As a result convection currents are formed in the inner part of the earth. These convection currents build pressure. As a result the crust of the earth breaks open and magma is released in the form of lava. This way mantle interacts with the crust.



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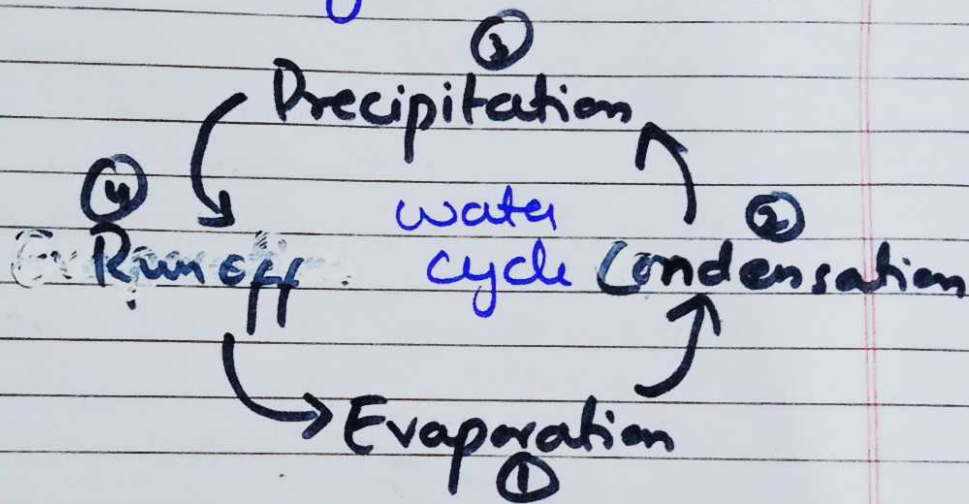
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Water Cycle of the Earth:

It is the movement of water from the surface of the earth to the atmosphere and from the atmosphere back to the earth.

Stages of water cycle



Water Cycle: Support life on earth!

- ① It maintains the earth temperature.
- ② It balances the amount of water on earth.

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⑥ It helps in the filtration of water.

⑦ It helps to replenish water reservoirs.

Impact of human activities on the Earth Ecosystem and natural resources:

① Global Warming:

Human activities have negative impacts on the earth ecosystem. It results in global warming which is the increase in the temperature of earth.

② Acid Rain:

Harmful emissions from human activities result in acid rain.

③ Exploitation of natural resources:

Human activities

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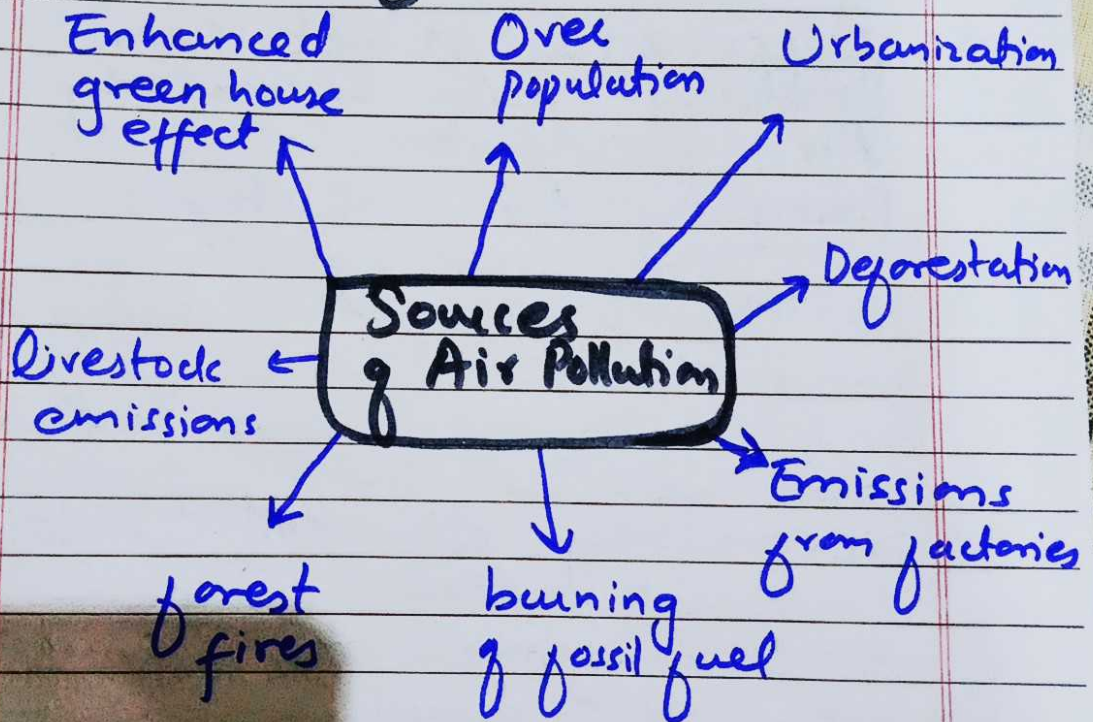
result in the exploitation
of natural resources like
water, minerals etc.

Part "d"

Air Pollution:

Any unwanted change in the atmosphere of the earth is called air pollution.

Sources of Air Pollution:



Effects of Air Pollution:

① Reduce life expectancy:
It reduces life expectancy of human. As per

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Chicago Air Quality Report,
"There is a reduction of
6-7 years in the life expectancy
of humans in South Asia."

② Formation of Smog:

Air pollution in
the environment leads to
smog in winter.

* Difference between Primary and Secondary Air Pollutants:

Primary Air Pollutants:

The air pollution
which is directly derived
from source
e.g. pollution from factories
and vehicles.

Secondary Air Pollutants:

It is not directly
derived from one source
e.g. acid rain.

* Efforts to reduce air pollutants through individual and collective source:

i) Car pooling:

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By means of car pooling less emissions will be released in atmosphere.

(iii) Prevent burning of wastes:

Waste should be decomposed rather than burned. It reduced emissions.

(iv) Use of adsorption technology to prevent emissions from factories.

Adsorption technique should be used to prevent emissions from factories.

(v) Transition to green energy:

By transitioning to green energy i.e solar and hydal, less harmful gasses will be released.

QUESTION: 4

Part "a"

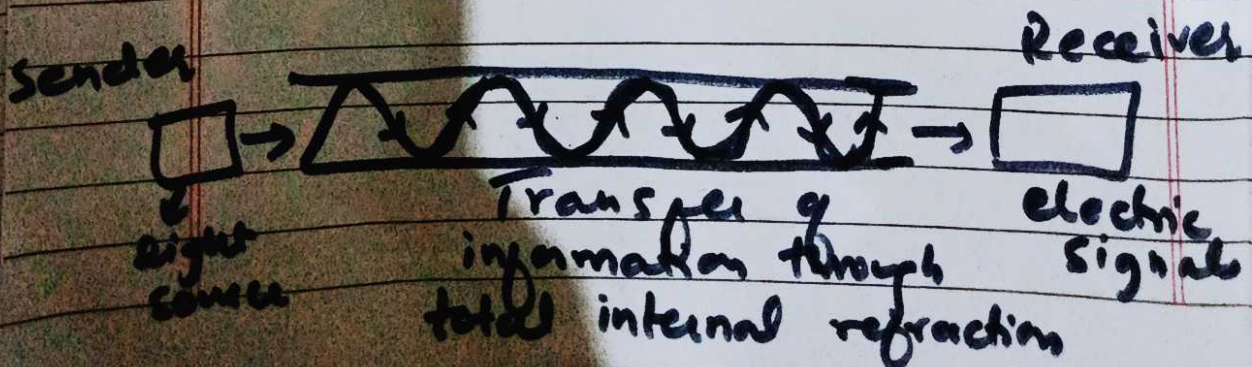
ANSWER:

Fibre Optics:

It is a telecommunication device which is used to transfer data in the form of light through thin glass wire.

Working Mechanism of Fibre Optics:

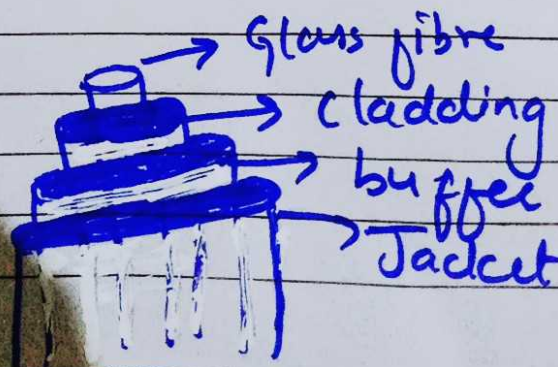
Fibre optics works on the principle of total internal reflection. To explain, light source is attached which convert electric signals to light and then at the receiver end light signals are converted into electric signals.



Advantages of fibre optics over traditional copper wires:

- (i) **High Bandwidth:**
Fibre optics has higher bandwidth than copper wire.
- (ii) **Flexible:**
It is more flexible.
- (iii) **High Security:**
Information is sent through high security.
- (iv) **Durability:**
Fibre optics are more durable and last longer.

* **High Speed data transfer through fibre optics.**



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Data is transfer with high speed in glass fibre as the buffer and cladding protect the glass fibre from any damage.

~~Ques~~
Part "b"

Earth Quake:

"The shaking of the earth crust due to seismic waves is called earth quake."

Causes of Earth Quake:

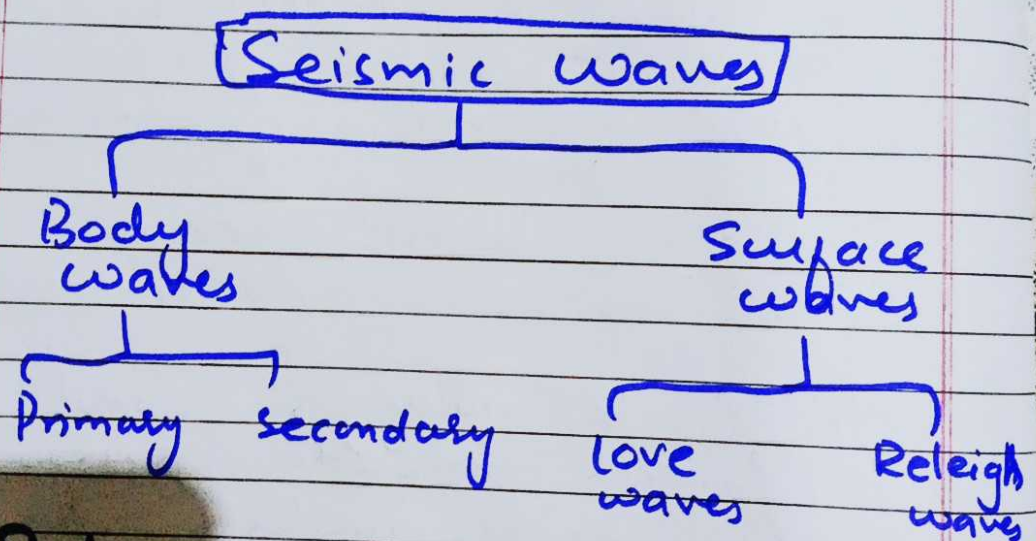
- i) Movement of tectonic plates ~~are~~ the primary cause of earth quakes.
- ii) Similarly, blasts can also cause earth quake.
- iii) HARP technology, used to break mountains, also cause earth quake.
- iv) Volcanic eruption also cause earth quake in limited area.
- v) Percolation of water inside high radioactive region can cause earth quakes.

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Effects of the earth-quake:

- i) human losses
- ii) Infrastructure damage
- iii) damage to communication networks
- iv) Economic loss.

Types of Seismic waves:



Role of earthquake-resistant construction and preparedness measures to reduce the impact of earth quake:

- i) Earthquake-resistant Construction:

Japan is the best model of earthquake resistant construction. Such infrastructure should be erected which is less prone to earthquake induced damage. This reduces the chances of infrastructure damage.

ii, Earthquake Preparedness:

By means of earthquake preparedness, life losses can be reduced from earthquakes.

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Part "c"

Answer:

Balanced Diet:

The diet which contains all the nutrients required for growth is called balanced diet.

Importance of balanced diet in maintaining good health:

As balanced diet has all the essential nutrients required for growth and normal functioning of the body. Thus, balanced diet is highly essential for good health.

Importance of Macromolecules

The nutrients which are required in high

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quantity is called macronutrients. For example, ① carbohydrates, which are required for energy of the body.

② Proteins:

Proteins make body organs and provide immunity to body.

③ Fats:

It is a storage form of energy.

Importance of micronutrients:

The nutrients which are required in less amount i.e. Ca, Mg, P, Cu etc.

These nutrients maintain the minerals level of the body.

Role of balanced diet in preventing chronic diseases:

Balanced diet provides energy and immunity to the body against several chronic diseases. As a result, the person

Lives a healthy life.

Part "d"

Answer

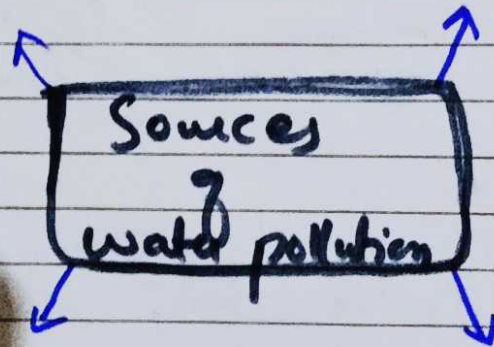
water pollution:

"Anything which harms the physical, biological and chemical composition of water is called water pollution."

Sources of water pollution:

Physical waste from households

chemical waste from industries



Thermal waste from nuclear facilities

Fertilizer and pesticide runoff from agriculture fields

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Effects of water pollution:

Death of aquatic animals

diseases in humans

Effects of water pollution

Disturb the ecosystem of water bodies

Impacts of water pollution on human health and environment:

(i) Drastic impacts on human health:

After consumption of polluted water, the different diseases can be caused in humans.

(ii) Disturb the ecosystem of water bodies:

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water pollution leads to the death of several animals essential for aquatic ecosystem. Thus, water pollution impacts the ecosystem of water bodies.

Measures to prevent water pollution

