

GEOPHYSICS

Geophysics is the branch of physics which deals with the study of physical, chemical, astronomical, geological and other properties of the earth.

- In this Topic, the following Contents must be Covered

- Structure and Composition of the Earth
- Earth quakes and Volcanoes
- Structure and Composition of the Atmosphere
- Green house effect and global warming.

1. STRUCTURE AND COMPOSITION OF THE EARTH

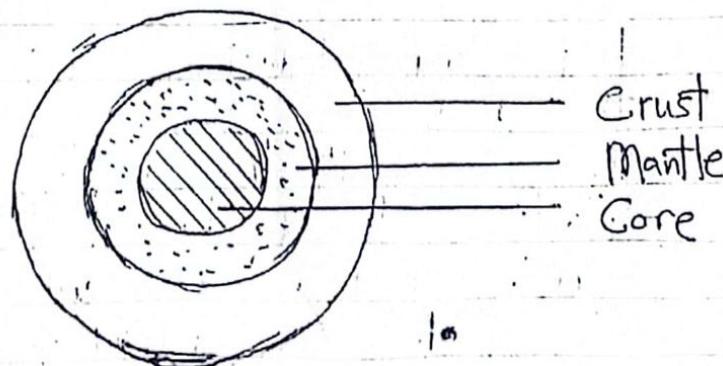
- The structure of the earth is composed of three major zones arranged in concentric manner.

- These zones are :

(a) Crust

(b) Mantle

(c) Core



(A) THE CRUST

- This is the outer solid layer of the Earth.
- It is extremely thin Compared to the radius of the earth.

FEATURES OF CRUST

- i) It is extremely thin
 - Ranging from 5-100 km as Compared to the radius of the earth which is about 6370 km.
- ii) It makes up less than 1% of the Earth by mass.
- iii) It consists of continental crust and oceanic crust.

REGIONS OF CRUST

- The Crust is divided into two regions
 - i) Continental crust
 - ii) Oceanic crust.

I. CONTINENTAL CRUST

- The Continental crust is heterogeneous (Composed of Various elements and of relative low density)
- It is Composed mainly of granite and sedimentary rock
- Because of its low density, the Continental crust floats on the mantle at higher elevation forming land masses and Mountains
 - the average density of Continental crust is about 2.7 g/cm^3

II. OCEANIC CRUST

- The oceanic crust is Basaltic (Dark Volcanic rock) and has higher density than that of Continental Crust
- Its average density is about 3.0 g/cm^3
- It floats at lower elevation forming ocean basins.

MOHOROVICIC DISCONTINUITY (MOHO)

- This is the boundary between the crust and the mantle
- Mohorovicic (Moho) zone ranges between 1 km and several km of thickness.

(B) THE MANTLE

- Moho is always between the crust and the mantle
So

Mantle : Is the thick layer between crust and outer core

: It begins from Moho and extends to a depth of approximately 2800 km below the Earth's Surface.

: The Mantle makes about 82% of the Volume and about 70% of the mass of the earth

- Mantle is made up of rocks both in solid and molten state which are rich in iron and Magnesium (Silicate rocks)

- The Mantle is divided into two parts, the Upper and Lower Mantle.

- The Upper Mantle has a temperature of about 1000°C the temperature increases towards the centre to about 3877°C
- Mantle rocks near the core are soft and able to move plastically.
- The mantle core boundary is called Gutenberg Discontinuity and is located at the depth of about 2800 km.

(C) THE CORE

- This is the inner most part of the earth
- It extends from Gutenberg discontinuity up to Earth's geometric Centre
- The Core is divided into two distinctive regions
 - i) Outer Core
 - ii) Inner Core

I. OUTER CORE

- The outer core is composed of extremely hot iron and nickel called Magma.
- Metals in the outer core are in molten form because of high temperature.

II. INNER CORE

- The inner core is composed of iron-nickel alloys
- It is very small making less than one percent of volume of the earth.
- It is solid because of the high gravitational pressure at this depth.

2. VOLCANOES

- A Volcano is an opening in the earth's crust through which molten rock (called magma) and gases force their way onto the Earth's Surface.
- It also refers to the solid structure created from lava, gases and hot particles that accompany a Volcanic eruption.

LAVA

- What is lava?

Lava: Is a molten rock (magma) that reaches the Earth's surface during Volcanic eruption.

WHERE MAGMA COME FROM

Magma originated from the mantle where, high temperature and pressure causes the rock to melt.

When the pool of magma has formed it raises through denser rock layers toward the surface of the Earth.

SAMPLE QUESTIONS

- ① Give the meaning of the following terms
- Volcanoes
 - Lava
- ② Briefly explain where magma come from

Answers

①

a) Volcanoes — Are features in the Earth's crust that allow lava to escape from a large pool of molten rock beneath the Earth's surface.

b) Lava — Are the molten rocks that has reached the earth's surface.

② Magma originated from the mantle where high temperature and pressure causes the rock to melt.

TYPES OF VOLCANOES

→ There are two types of Volcanoes

(a) Fissure Volcanoes

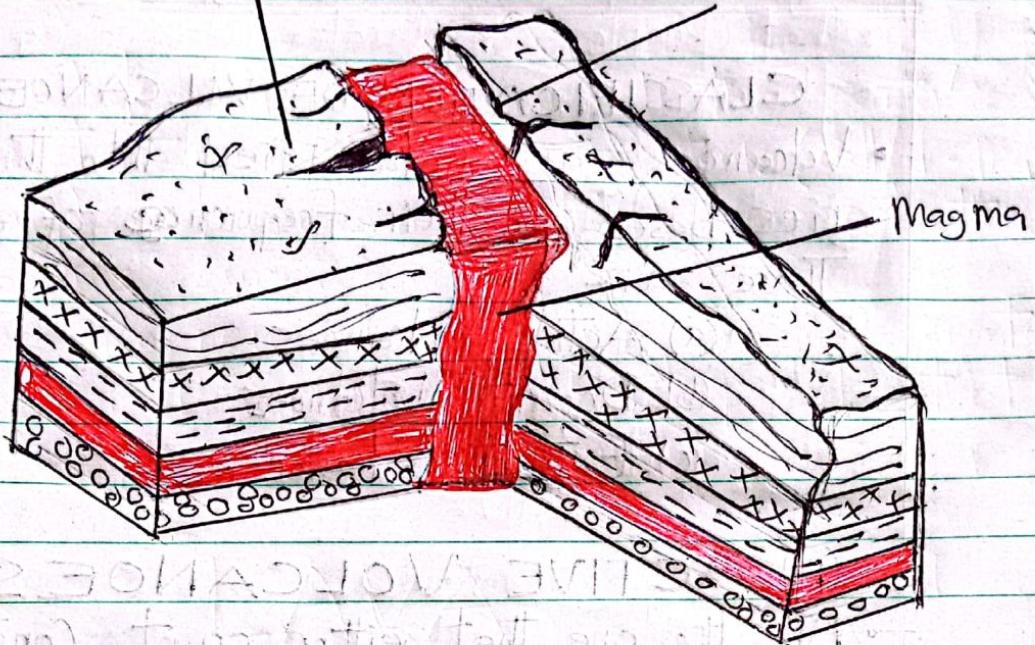
(b) Central Volcanoes

(A) FISSURE VOLCANOES

→ This is the one in which lava is usually ejected quietly and continuously forming enormous plains or plateaus of basaltic volcanic rocks.

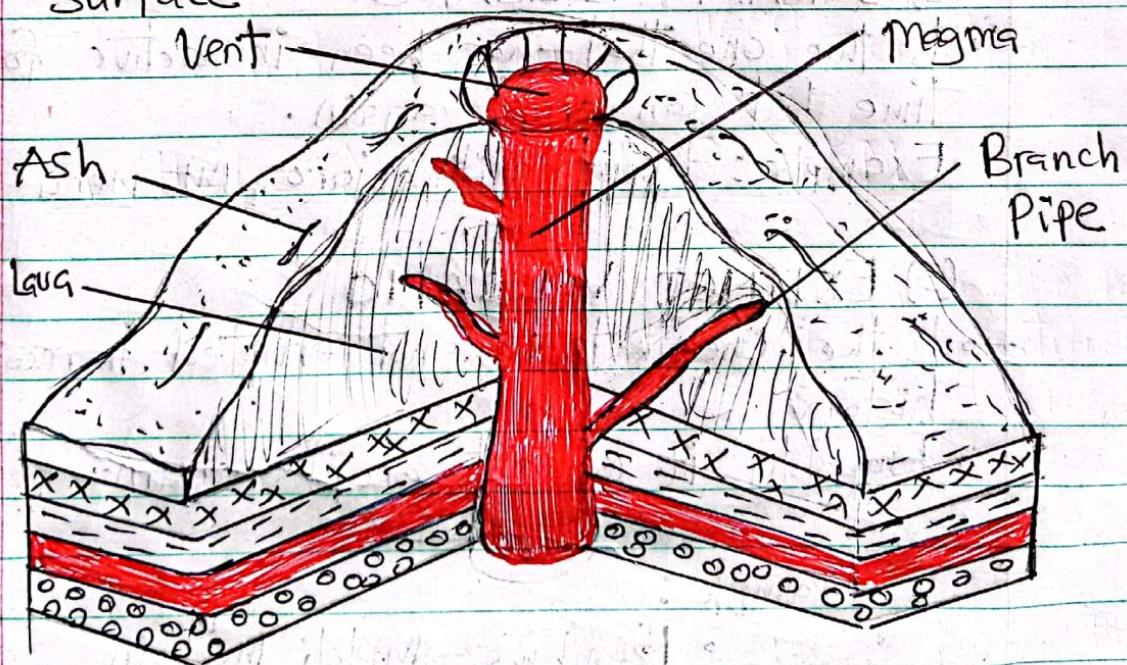
Gentle basaltic
slope of lava

Fissure



CENTRAL VOLCANO

- This is the one having a single vertical main vent through which Magma reaches the earth's surface.



- It is usually develop a cone that has been formed from successive layers of lava and ash

CLASSIFICATION OF VOLCANOES

- Volcanoes are classified into three categories based on their frequency of eruption. These are

- (a) Active Volcanoes
- (b) Distant Volcanoes
- (c) Extinct Volcanoes.

(A) ACTIVE VOLCANOES

- Are the one that either erupt constant or have erupted in recent times

Example: Oldonyo Lengai Volcano

(B) DOMANT VOLCANO

- Is the one that has been active for some time but can erupt again.

Example: Mount Kilimanjaro, Mt Meru

(C) EXTINCT VOLCANO

- Is the one that has not erupted in recorded history
- Probably it can not erupt again.

Example:

- Izumbwe-Mpoli Mountain
- Mount Elgon
- Ben Nevis Mountain in UK.

EFFECT OF VOLCANOES

(i) Land scape : A land scape is an extensive piece of inland feature seen from one place.

- Volcanoes have great effect on land scape in that much of the earth's surface covered with volcanic rocks.
- Volcanoes are also responsible for the formation of mountains and island.

(ii) Vegetation : Volcanic eruption destroys vegetation and wild life. After the eruption, sometimes set the surrounding vegetation on fire.

- Wild animals are also killed by being buried in the lava or burnt from forest fires.

(iii) Environment : Volcanic eruptions emit harmful gases into the environment.
Eg: Sulphur dioxide

- Such gases contribute global warming and climate change.

(iv) Human life and property.

- Volcanic eruptions sometimes kill people and destroy property.

- People who monitor Volcanic activities usually warn people of an impending eruption so that people can vacate such area. (i)
- However some eruptions happen occur unexpectedly such eruptions bury people, animals and buildings in mountains of lava.

(v) Soil formation.

- Volcanoes help in soil formation by bringing important soil minerals from deep underground onto earth's surface.

(vi) Minerals

- Volcanic eruptions bring variable minerals from deep underground onto the earth's surface.
- The minerals are important economic resources.

Problem - 03

- Draw a cross-section of the earth's interior region and on it show
 - The crust
 - The mantle
 - The inner core
 - The outer core

Problem - 04

- Explain why the inner core of the Earth is solid while the outer is liquid even the temperature is high.

Answer

- It is because of very high pressure in the inner core.

Problem-05

- Explain how Volcanoes occur
- State three effect of Volcanic activity

Answer

(a) High temperature and pressure in the mantle causes the rock to melt. When a large pool of magma (molten rock) has formed, it rises through denser rock layer toward the surface of the earth and hence Volcanoes occur in this way.

(b) Three effect of Volcanoes

1. Volcanoes helps in soil formation

2. Volcanoes destroys vegetation and kills wild animals.

3. Volcanoes release harmful gases to the environment.

4. Lead to land scape formation

→ Volcano lead to formation of mountains, islands, plateaus and valleys.

5. Increase soil fertility.

→ Ash and lava breakdown become soil that are rich in nutrients and become good areas for crop planting activities.

Problem - 06

- (a) What are the dominant metals in the core?
(b) Mention demerits of Volcanoes.

Answer

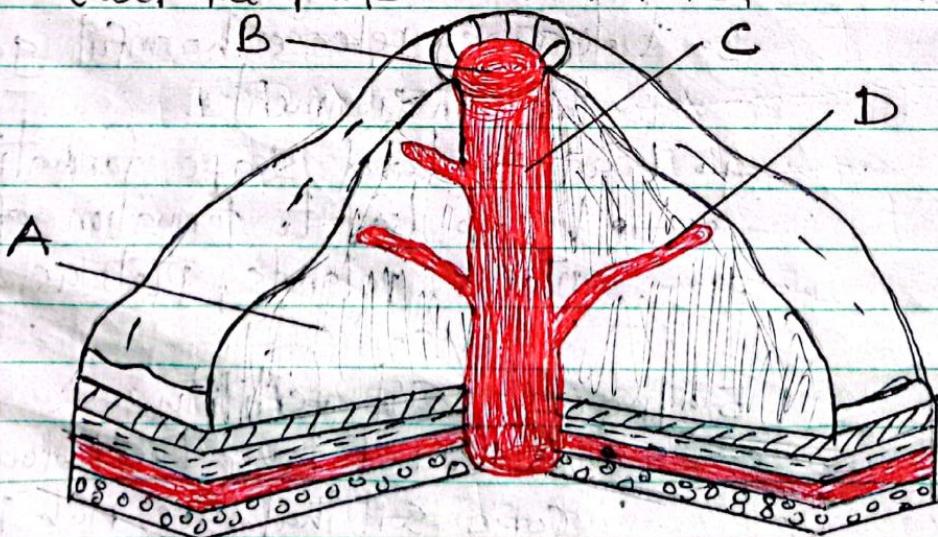
(a) The dominant metals in the core are Iron and Nickel.

(b) Demerits of Volcanoes

- i) They pollute environment.
- ii) They destroy property and vegetation.
- iii) They lead to loss of plant and animals lives.
- iv) They emit toxic gases which can harm living things.

Problem - 07

The diagram below shows the structure of Volcano. Label the parts marked A, B, C and D



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12

EARTHQUAKES

- An earthquake : Is a sudden motion or shaking of the earth caused by sudden release of energy that has accumulated in the earth's crust.

HYPOCENTRE/FOCUS

- Is the point within the earth where an earthquake begins.

SEISMIC WAVES

- Is a series of progressive disturbances that are propagated through the earth transmitting the energy released from an earthquake.

TYPES OF SEISMIC WAVES

- Seismic waves are of three types:
 - (a) Primary waves (P-waves)
 - (b) Secondary waves (S-waves)
 - (c) Surface waves

(A) PRIMARY WAVES

- Are the first waves released from the hypocentre / focus.
- They are felt as sudden jolt.

(B) SECONDARY WAVES

- These waves arrives few seconds later
- They are felt as a series of side to side thermours

(C) SURFACE WAVES

- Surface waves radiate outwards from a point on the earth's surface directly above the hypocentre (focus)
- This point is called epicentre of an earthquake.

EPICENTRE : Is a point on the earth's surface directly above the hypocentre / focus.

TYPES OF SURFACE WAVES

- There are two types of surface waves.
 - (i) Rayleigh waves.
 - (ii) Love waves.

I. RAYLEIGH WAVES

- Rayleigh waves creates rolling movement that make the ground / land surface to move up and down.

II. LOVE WAVES

- Love waves makes the land surface shift from side-to-side
- It is the surface wave that do damage to surface structure such as buildings and H.E.P. Plants

EARTH QUAKE SCALES

- The nature of an earth quake is usually described by measuring two properties.
 - (a) Magnitude
 - (b) Intensity.

(A) MAGNITUDE OF EARTH QUAKE

- This is a measure of a strength of an earth quake or is a measure of the amount of energy that the rocks in the earth's crust release when an earth quake occur.
- It is measured on the RITCHER SCALE
- The Ritcher Scale is based on largest seismic waves recorded for an earth quake, no matter what type of wave was strongest.
- The scale ranks earth quake based on how much the ground shake.

(B) INTENSITY OF EARTH QUAKE

- This is a measure of the effects of an earth quake in a particular place including changes it cause to the land
- It is measured on a Modified Mercalli Scale.
- The scale has twelve (xii) levels of intensity
- Each level is defined by a group of earth quakes effects, such as shaking of the ground and damage to the surface structure such as buildings, roads and bridges

- This Scale is designed by roman numerals (I - XII)

1. Level I-V : Used to describe what people see and feel during small to moderate earth quake.

2. Level VII-XII : Used to describe damage to surface structure during Moderate to Catastrophic earth quake.

EARTHQUAKES HAZARDS

- Earth quakes give hazards which lead to a great risk to human life, Animals and environment at large
- Some of the earth quakes hazards are

I. IT CAN CAUSE LAND SLIDE

- The shaking caused by earth quakes can cause unstable, hill sides, mountain slopes and cliffs to move down wards creating land slides.
- In massive land slides soil and rock accelerate down the slopes sweeping away everything in their path.

II. IT CAN CAUSE TSUNAMI

- Tsunami is sea-waves caused by earth-quake in an ocean floor.
- The ocean floor can raise or fall causing the ocean water to rise and fall too.

→ When tsunami hits the shore it crashes inland carrying away everything in their path.

III. CAUSES BUILDINGS TO COLLAPSE

- Earth quakes do not actually kill people
- It is the hazards that are associated with earth quake kill people.
- The majority of people killed or injured in an earth quake are trapped in building that collapse because of ground underneath shaking

IV. IT CAUSES FIRE OUT BREAK

- Earth quakes can trigger fire outbreak
- This happens when an earth quake causes gas or oil pipes to break
- It can also happen as a result of the collapse of electricity lines.

V. IT CAUSES BACKWARD RIVERS

- Tectonic ground can make rivers to change their course
- This can result in the creation of earthquake lakes

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Page - 17

EARTH QUAKE WARNING SIGNS

1. Thermal-Indicator : A few month before the occurrence of an earth quakes the average temperature of the place keeps on increasing.

: On the day of earth quake the average temperature of the place becomes 5°C to 9°C above the normal average temperature for that day.

2. Seismo - geomagnetic : Few days before the occurrence of an earth quake the sub surface temperature increases

: This has an effect in the reduction of geo magnetic field, this reduction in geo magnetic field affect the propagation of electromagnetic waves.

: This experienced abundantly in radio, television and telephone

i) About 100 min - 150 min before the occurrence of an earth quake mobile telephones stop working.

- 3-Water Indicator
- : Before the occurrence of an earth quake there is sudden rise and fall in the level of water in wells.
 - : Well water may turn muddy
 - : At times a fountain appear may appear inside the well
 - : Sometimes a fountain appear on the ground few hours before the occurrence of earth quake
 - : Before the occurrence of an earth quake there is sudden and rapid increase or decrease in the flow of water in rivers.

- 4-Animal Indicator
- : Before the occurrence of an earth quake the entire animal kingdom is highly disturbed
 - : They move in fear and disordered manner
 - : Birds do not perch on trees, but they move at low altitude emitting a shrill sound
 - : Domestic animals such as Cows, Dogs and Cats struggle against being tied up and they may even turn on the owner.

5. Human Indicator : Before the occurrence of an earth quake sensitive patients in hospitals are highly disturbed
- They experienced high blood pressure, heart trouble and headache.
 - The most obvious human indicator is the increase in number of child delivery in any hospital.

PRECAUTION AGAINST EARTH QUAKE HAZARDS

- (i) Pick a safe place where things will not fall on you, away from windows or tall-heavy furniture.
- (ii) Wait in a safe place until the shaking stops, then check to see if you are hurt.
- (iii) Move carefully and watch out for broken things creating hazards.
 - Be aware of additional earth quake called after shock.
- (iv) Be on look out for fire
 - Fire is the most common earth quake related hazards due to damage gas/oil pipes and collapse of electricity lines
- (v) If you must leave the building after earth quake use stairs and not the elevator.

Prepared by Robert Msaki 0624254757

Problem-08. I wanted

- Explain how an earthquake occurs.

ANSWER

- Usually earthquakes occur near boundaries between tectonic plates or in areas with faults formed millions of years ago.
- When tectonic plates grind past each other instead of sliding smoothly past each other, they become locked together and cause energy and pressure to build below.
- When the pressure becomes sufficiently high, it overcomes the friction force holding the plates together. This causes the plates to be moved against one another suddenly thereby releasing pressure beneath. After pressure is released, the plates hold together again. The sudden movement of tectonic plates to release energy below them is what is experienced as an earthquake.

An Earthquake: Is a sudden shaking of the earth caused by a sudden release of energy that has accumulated within or along edges of the earth's tectonic plates.

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COMMON QUESTIONS IN MOST EXAMINATION

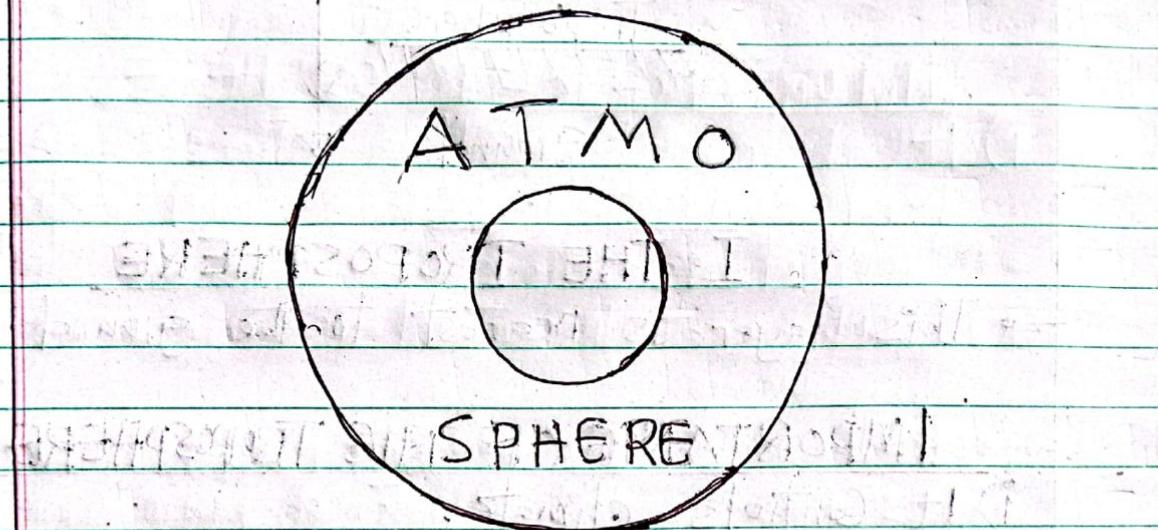
- (09) a) Explain the meaning of the term Earthquake
b) Give the meaning of
i) Hypocentre
ii) Epicentre
- (10) a) Name an instrument used to measure an earthquake.
b) Give five hazards associated with earthquake and precautions to be taken against earthquake hazards.
- (11) State any four (4) indications that may predict the occurrence of an earthquake.
- (12) Distinguish between a Rayleigh wave and Love wave.
- (13) Mock - DSM - 2023
Explain effect of Volcano and earth quake.
- (14) How does difference between oceanic and continental crust lead to the presence of oceanic basins and continents?
- (15) Can an earthquake cause a volcanic eruption and vice versa? Explain.

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22

3. STRUCTURE AND COMPOSITION OF THE ATMOSPHERE.

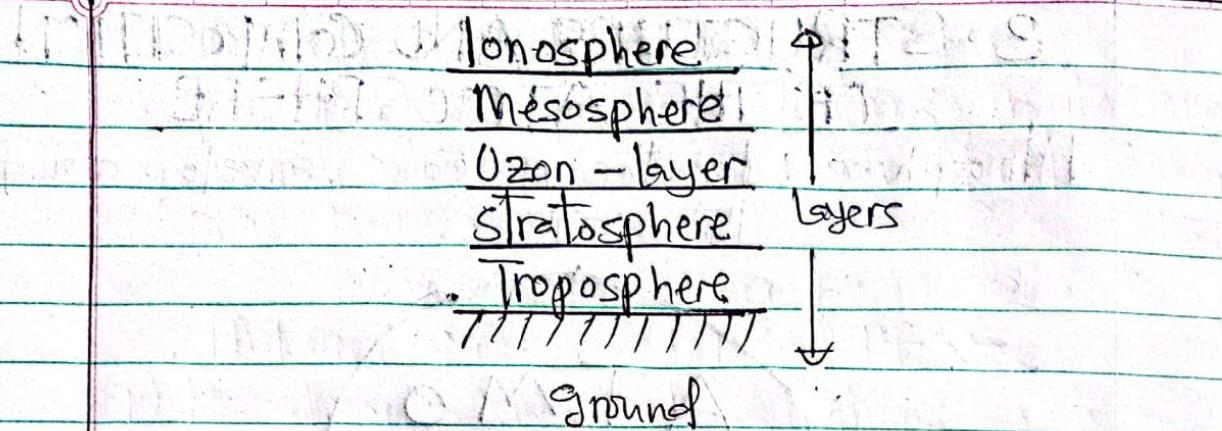
Atmosphere: Is the gaseous envelop around the earth.



- It extends to a height of some km above the surface of the earth
- The atmosphere is composed of gases mainly
 - i) Nitrogen (78%)
 - ii) Oxygen (21%)
- It also consists of Carbon-dioxide, neon, water vapour, dust particles etc.

LAYERS OF ATMOSPHERE

- The atmosphere is composed of four layers
 - i) Troposphere.
 - ii) Stratosphere.
 - iii) Mesosphere.
 - iv) Ionosphere



I. THE TROPOSPHERE

- This layer is nearest to the ground.

IMPORTANCE OF THE TROPOSPHERE

i) It Controls climate.

- : Most of the weather phenomena occurs in the troposphere.
- : It is the region where clouds and rain are formed.

ii) It is important to life.

: The gases found in the troposphere are important to life

O_2 → Used by animals for respiration

CO_2 → Used by green plants for photosynthesis

N → Provide in active environment for many chemical processes to occur

: The gases found in the troposphere also support many chemical processes such as Combustion, weathering and oxidation.

II. STRATOSPHERE

- The stratosphere lies above the troposphere
- The important part of stratosphere is the ozone layer which contains ozone in abundance.

IMPORTANCE OF STRATOSPHERE

- i) The ozone layer in the stratosphere absorbs harmful ultraviolet radiation coming from the sun.
- ii) Planes fly in the stratosphere.
 - It because the stratosphere has strong steady horizontal winds which are above stormy weather condition of the troposphere.

III. THE MESOSPHERE

- This layer is found just above the top of the stratosphere.

IMPORTANCE OF MESOSPHERE

- i) Meteors burn away in this layer while entering the earth's atmosphere.
- ii) Harmful radiations such as cosmic rays are absorbed by mesosphere.

IV. THE IONOSPHERE

- This is the region in which the constituent gases are ionized by ultraviolet radiation and X-ray from the sun.
- It is the region which contains high concentration of charged particles called

(25)

Ions and free electrons

- The presence of free electrons in the ionosphere allows the propagation of electromagnetic wave.

IMPORTANCE OF IONOSPHERE

- i) It absorbs harmful radiations such as hard and soft X-rays and extreme ultra violet radiations
 - ii) It plays an important role in communication
- Radio waves are reflected off the ionosphere allowing long distance radio communication

NOTE: The ionosphere is also called Thermosphere.

Problem - 16

- (a) Arrange the various layers of atmosphere starting from the earth's surface.
- (b) Give one important of each of the layers of the atmosphere.
- (c) Explain the meaning of ionosphere.

Problem - 17

- Give the summary of the origin and composition of the ionosphere. What is the net electric charge in the ionosphere?

ANSWER

- Ionosphere is the upper part of the atmosphere. The ionosphere is formed due to the 10²⁶

nization of gaseous atoms as they absorbs ultra violet radiations from the Sun, gamma and X-rays.

• And the net electric charge in the ionosphere is zero.

Problem-18

(a) What is meant by the following terms as used in geophysics?

i) Tsunami

ii) Magma

(b) i) List down the various layers of the atmosphere starting from the earth's surface

ii) Which layer in part (b)i, above is nearest to the earth? Explain two importance of it.

ANSWER

(a)

i) Tsunami : Is a sea wave which is caused by disturbance of the ocean floor either by an earthquake or Volcanic activity.

ii) Magma : Are molten rocks inside the earth's mantle which are ejected during a Volcanic eruption.

(b) Layers of the atmosphere

i) Troposphere

iv) Thermosphere

ii) Stratosphere

v) Exosphere

iii) Mesosphere

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- The Troposphere is the nearest layer to the earth

Importance : Weather formation

: Supports living things through oxygen and CO_2 contained in it.

Problem-19

- Briefly explain the importance of stratosphere to living things on the earth's surface

ANSWER

- (i) It contains ozone which absorbs harmful radiations from outer space.
- (ii) It has air which supports life and other processes on earth.
- (iii) Aeroplane fly in this layer.

Problem-20

- Give a reason for each of the following
- (i) We find it difficult to breathe when we climb mountains.
 - (ii) The atmosphere is the most dynamic entity.
 - (iii) All the weather phenomena take place in the troposphere.

ANSWER

- (i) Because the layers of the atmosphere become thinner at high altitudes.

- This means that there is less pressure to push the air into the lungs and a lower percentage of oxygen in the air. This makes it harder to breath.

- (ii) Because of its composition, large masses of air are being moved up and down and cross the surface of the earth.
- (iii) The troposphere is characterized by regular decrease in temperature known as normal lapse rate. The average decrease is 1°C for every 166 metre altitude gain. This temperature variation is responsible for many turbulences which result in all weather phenomena taking place in the troposphere.

5. GLOBAL WARMING

What is global warming?

Global warming: Is the increase of the average temperature near or on the surface of the earth as a result of greenhouse effect.

Green house effect: This is the effect in which the emission of radiation by the atmosphere warms the earth's surface.

The main green house gases are:

- i) Carbon dioxide
- ii) Methane
- iii) Dinitrogen oxide
- iv) Chlorofluoro Carbon (C-F₆S)

- The green house acts as a minor reflecting back to earth some of the heat energy which would otherwise be lost to space.

SOURCE OF GREEN HOUSE GASES

I. CARBON DIOXIDE

- Carbon dioxide contribute over 50% of the green house effect
- Some sources of carbon dioxide in the atmosphere are
 - i) clearing of burning off vegetation.
 - ii) Burning of fossil-fuels such as coal and petroleum. These fossil-fuels are burnt in cars, power stations and in industries.

II. METHANE

- Some of the source of methane in the atmosphere are
 - i) Agricultural activities
 - ii) The gas released from wet lands such as rice fields and from animals such as cud-chewing animals like cow.
 - iii) Mining of coal and oil.
 - iv) Burning and vegetation.

III. CHLOROFUOROCARBONS

- These are organic compounds made of chlorine, fluorine and carbon.
- Source of CFCs are ; Refrigerators, aerosols and Air-conditioning plants.

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CONSEQUENCES OF GLOBAL WARMING

- i) Rise in temperature of the oceans.
- ii) Rise in Sea level : Due to thermal expansion of oceans and melting of land ice
- iii) Change in world's climatic patterns
 - Nowadays it is becoming hard to forecast the weather accurately. Rain no longer falls when expected, some rain are heavier than expected causing flooding, sometimes the rain are far less than expected leading to drought.
- iv) Acidification of the oceans
 - The Carbon dioxide dissolves in the water and forms a weak carbonic acid. This lower the pH of the ocean water. Increasing of acidity and temperature in ocean water lead to the bleaching and death of coral reefs.
- v) Extreme weather events such as floods, heat waves, drought, hurricanes and Tornadoes.

Other effects

- i) High or lower agriculture harvest
- ii) Extinction of some animal and plant species.
- iii) Increase in number of vectors, organism that transmit diseases.

(31)

SOLUTIONS TO GLOBAL WARMING

The following are some of the measures that can be taken to reduce the emission of greenhouse gases into the atmosphere.

- i) Put in place energy - conservation measures to reduce the use of fossil fuels.
- ii) Use cleaner alternative sources of energy such as solar energy, wind energy, biomass and geothermal.
- iii) Replant trees (afforestation) that would absorb carbon dioxide and massive deforestation.
- iv) Recycling is an absolute necessity.
→ Countries should set policies that encourage recycling of waste products.
- v) Emissions of carbon dioxide from buildings should be minimized by designing buildings that will require less heating, cooling or lighting.
- vi) Government to adopt carbon emission policies.
- vii) Farmers should be encouraged to invest on organic farming, which is free from fertilizers that adds pollutants which contribute to global warming.

IMPORTANT POINTS TO NOTE

1. The Earth's crust and part of the mantle are cracked into huge pieces called tectonic plates which move at very low speed.

2. TYPES OF TECTONIC PLATES

- i) Destructive boundaries :-
- ii) Constructive boundaries :-
- iii) Conservative boundaries :-

3. SEISMOGRAPH

→ Is an instrument used to record ground movements caused by earthquake.

4. VOLCANIC ERUPTION

→ The movement of magma from the earth's crust into the atmosphere.

5. CAUSES OF EARTHQUAKES

- i) Collision of tectonic plates
- ii) Energy release in the mantle
- iii) Violent volcanic eruptions
- iv) Nuclear explosions
- v) Gravitative pressure
- vi) Magma movement within the crust

6. Evidences of continental drift

- i) Similar plant and animal remain in different continents
- ii) Similarities in rock structures along coast of West Africa and eastern South America

Problem - 21

What do CFCs stand for? What is the role of CFS in global warming?

ANSWER

CFCs stand for chlorofluorocarbons. Ozone layer is responsible for protecting the surface of the earth from the sun's harmful radiations. CFCs destroy the ozone layer of the atmosphere. This makes the way for the ultraviolet rays to reach the earth; thus, increasing the temperature which leads to global warming.

Problem - 22

- Briefly explain five(5) effects of global warming in our environment.
- Account for green house effect with five(5) points

ANSWER

- Effect of global warming in our environment
 - Increase the temperature of the oceans.
 - Rise in sea level due to melting land ice. This may lead to flooding of the coastal land.
 - Change in world's climate patterns.
 - Acidification of the oceans.
 - Extinction of some animals and plant species.

(b) Green house effect is caused by the green house gases include the following

- i) Water Vapour
- ii) Carbon dioxide
- iii) Methane
- iv) chlorofluorocarbons
- v) Dinitrogen oxide : Is produced from both natural and human made processes.

Problem-23

- (a) Give the meaning of the term global warming
(b) Name four gases that contribute to global warming and give one source of each.

ANSWER

(a) Global warming : Is the increase in surface temperature of the earth due to increase in the amount of green house gases such as CO_2 in the atmosphere.

(b)

| GAS | SOURCE |
|-----------------------------|--|
| Carbon dioxide | Burning of fossil fuels and wood. |
| Nitrous oxide | From ploughing the soil and from burning of fossil fuels such as coal and petroleum. |
| Methane | Natural gas, fermentation of decaying plants |
| chlorofluoro carbons (CFCs) | Aerosols, sprays and refrigerants containing CFCs. |
| Ozone | Ozone layer of the atmosphere. |

Problem - 24

- How does global warming affect climate change?
- How can we control global warming?

ANSWER

- The change in climatic conditions is a result of global warming. The burning of fossil fuels, cutting down of trees etc causes the temperature of the earth to increase. High temperature changes the weather patterns, causing dry areas to get drier and wet areas to get wetter. Thus, increasing the frequency of disasters like floods, droughts etc.
- The release of Carbon dioxide and other green house gases into the atmosphere is the major cause of global warming. It can be reduced by setting a high price of carbon, increasing the biofuels production from organic waste. Use of renewable energy like solar and wind power, safeguarding forests and improving energy efficiency and vehicle fuel economy.

Problem - 25

- Mention three effects of global warming.
- What is the major cause of global warming?
- Briefly explain three measures that can be taken to control global warming.

ANSWER

(a) Effects of global warming :-

- i) Increase in earth's surface temperature
- ii) Melting of Polar ice caps.
- iii) Loss of Snow in Snow-Capped mountains like Kilimanjaro
- iv) Rise in the level of water in the Seas
- v) Submergence of coastal and islands

(b) The major cause of global warming is pollution of the atmosphere by greenhouse gases such as CO_2 , water and methane

(c) Controlling global warming :-

- i) Planting trees
- ii) Reducing Industrial emissions
- iii) Reducing the use of fossil fuels such as Coal and petroleum.

Problem - 26

→ Suppose you are living in an area known for volcanic eruptions. One day, when you were sitting in your balcony, you suddenly noticed a volcano erupting at a distance. State what happened thereafter.

ANSWER

One day, when I was sitting in my balcony, I suddenly noticed a volcano erupting at a distance. It was a horrifying sight.

- i) I saw a plume of Ash rising from the volcano

It was a thick, dark cloud that blocked out the sun.

- ii) Bright orange lava sprouted out of the volcano and started flowing down the side of the volcano.
- iii) There were also explosions of ash and rock from the volcano, which created a loud booming sound and sent debris flying through the air.

TEST YOUR CAPACITY

- (27) In your village, people are complaining on the increase of temperature nowadays.
 - (a) What are you going to explain to them about the possible causes of the prevailing temperature?
 - (b) Clarify to them, the measures to be taken to mitigate the situation.
- (28) You are working on the village where people are mainly using charcoal as a source of energy. Explain to them the effects that might arise to the environment as a result of prolonged use of charcoal.
- (29) Explain the side effects of industrial development with respect to global warming.
- (30) a) If energy can be neither created nor destroyed, what happens to the energy released during the earth quake?
b) Can an earthquake cause a volcanic eruption and vice versa? Explain.

END OF TOPIC # (38)