Class-IX

Geography, Chapter-11

A. Answer the following questions:-

1. What is the significance of atmosphere?

Ans.1 The atmosphere of Earth protects life on Earth by creating pressure allowing for liquid water to exist on the Earth's surface, absorbing ultraviolet solar radiation, warming the surface through heat retention (greenhouse effect), and reducing temperature extremes between day and night.

2. State the components of the atmosphere.

Ans.2 The Earth's atmosphere consists of a mixture of various gases surrounding the Earth up to approximately 10,000 km, approaching the diameter of Earth itself. It is an envelope of gases encompassing the Earth, held by gravity. Two main gases Nitrogen and Oxygen (78% and 21%respectively), make up about 99% of the clean dry air. The remaining gases are almost inert and constitute about 1% of atmosphere.

3. Name the different layers of the atmosphere.

Ans.3 On the basis of structure, the atmosphere consists of four layers:-

i. Ttroposphere ii. Stratosphere iii. Ionosphere iv. Exosphere

4. State the important characteristics of each of the layers.

Ans.4 Important characteristics of the layers of the atmosphere:-

i. Troposphere:-The lowest region of the atmosphere. The average height of troposphere is fixed at 14 km above sea level. However, its height varies from place to place and season to season. Virtually all weather phenomena that affect our life directly take place within troposphere. The troposphere contains particles of dust, which serve as nuclear centres around which the water vapour condenses to form cloud particles.

ii. Stratosphere:-The lower limit of stratosphere is at tropopause(a boundary between troposphere and stratosphere). This layer is free of water vapour and dust. It extends from 18 to 80 k between 50° and 60° latitudes. No visible weather phenomena take place in this layer. Cirrus clouds, called the 'mother-of-pearl clouds' are occasionally formed in lower stratosphere. One important feature of this layer is that t contain s the ozone layer. It is an ideal layer for flying jet and aircrafts.

iii. Ionosphere:-Ionosphere extends from 80 km to about 480 km. In this layer, the ionisation of molecules and atoms occurs mainly as a result of ultraviolet rays, X-rays and gama rays. In this layer, the temperature decreases with increase in elevation until a low point of -100°Cis reached. Beyond this level, the temperature increases again as a result of absorption of short wave solar radiation by the atoms of oxygen. Nitrogen in the extremely rarified air of ionosphere. Ionosphere reflects low frequency radio

waves, but absorbs medium and high frequency waves. Thus, this layer is especially important in long distance radio communication.

iv. Exosphere:-As discussed earlier, this outermost layer of atmosphere forms the outermost boundary of our atmosphere. The atmosphere in this region is highly atmosphere. The atmosphere in this region is highly predominant with rarified Hydrogen and Helium gases.

5. What is the significance of atmosphere for the Earth?

Ans.5 The importance of atmosphere for the earth are:-

⇒The presence of the atmosphere plays a significant role in the water cycle. It facilitates the formation of clouds which remains suspended until they are heavy enough to pour down on the earth as rain, hail or snow.

⇒Protects the life forms of the earth from the harmful UV rays of the sun. The presence of the ozone layer does this by reflecting the UV rays of the sun.

⇒It keeps the temperature of the earth constant so that it is suitable to support life.

⇒It protects the earth from smaller meteors.

⇒Contains Nitrogen, Oxygen and other gases which are necessary to support the life form on the earth.

⇒Facilitates combustion and without the atmosphere combustion is not possible.

6. What are the properties of Troposphere?

Ans.6 Troposphere:-The lowest region of the atmosphere. The average height of troposphere is fixed at 14 km above sea level. However, its height varies from place to place and season to season. In addition to pure dry air, the troposphere contains water vapour, colorless, odourless gaseous form of water, which mixes perfectly with other gases. The degree to which water vapour is present in the air is known as humidity. Water vapour condenses into clouds and fog. Virtually all weather phenomena that affect our life directly take place within troposphere. The troposphere contains particles of dust, which serve as nuclear centres around which the water vapour condenses to form cloud particles.

7. What is Tropopause?

Ans.7 The tropopause is the boundary in the Earth's atmosphere between the troposphere and the stratosphere. It is a thermodynamic gradient stratification layer, marking the end of the troposphere. It lies, on average, at 17 kilometres above equatorial regions, and about 9 kilometres over the Polar Regions.

8. What is the significance of ozone in the atmosphere?

Ans.8 Ozone absorbs the burning ultraviolet radiation from the Sun. In the absence of the ozone layer found in atmosphere and in the event of ultraviolet rays reaching Earth's surface, our planet would have

been unfit for human habitation and other living beings. Thus, ozone layer protects us from these harmful rays. Thus, presence of this layer is a boon to human beings.

9. What are the causes of destruction of ozone layer?

Ans.9 Causes of the destruction of the ozone layer are:-

i. The environmentalists have expressed great concern that the emission of Nitrogen Oxide by a large number of supersonic transport aeroplanes may cause deterioration of ozone layer.

ii. Release of synthetic chemicals primarily Chlorofluoro-carbons (CFCs) into the atmosphere.

iii. CFCs are synthetic industrial chemical compounds containing Chlorine, Fluorine and Carbon atoms. These are used as cleaning agents, in refrigerators, fire extinguishing fluids, spray, car propellants and insulting foams. They slowly release CFC molecules into atmosphere.

10. Give the properties of Ionosphere.

Ans.10 Ionosphere:-Ionosphere extends from 80 km to about 480 km. In this layer, the ionisation of molecules and atoms occurs mainly as a result of ultraviolet rays, X-rays and gama rays. In this layer, the temperature decreases with increase in elevation until a low point of -100°Cis reached. Beyond this level, the temperature increases again as a result of absorption of short wave solar radiation by the atoms of oxygen. Nitrogen in the extremely rarified air of ionosphere. Ionosphere reflects low frequency radio waves, but absorbs medium and high frequency waves. Thus, this layer is especially important in long distance radio communication.

11. What is meant by Greenhouse Effect?

Ans.11 The process where bi radioactively active gases absorb and delay the loss of heat to space, thus keeping the lower troposphere moderately warmed throught the radiation and radiation of infrared wavelengths.

12. What do you mean by 'Global Warming'? What are the consequences of 'Global Warming'?

Ans.12 Human activity affects global surface temperatures by changing Earth's radiative balance—the “give and take” between what comes in during the day and what Earth emits at night. Increases in greenhouse gases—i.e., trace gases such as carbon dioxide and methane that absorb heat energy emitted from Earth's surface and reradiate it back—generated by industry and transportation cause the atmosphere to retain more heat, which increases temperatures and alters precipitation patterns.

Consequences of 'Global Warming' are:-

i. More frequent and severe weather. Higher temperatures are worsening many types of disasters, including storms, heat waves, floods, and droughts.

ii. Higher death rates and cause of skin cancer.

iii. Dirtier air cause of increasing pollution.

iv. Higher wildlife extinction rates.

v. More acidic oceans and decreasing in coral reefs.

vi. Higher sea levels.

13. Name a few measures that could be taken to save ozone layer.

Ans.13 How can we protect the ozone layer? Avoid the consumption of gases dangerous to the ozone layer, due to their content or manufacturing process. Some of the most dangerous gases are CFCs (chlorofluorocarbons), halogenated hydrocarbon, methyl bromide and nitrous oxide. Minimize the use of cars. Awareness about ozone among the people is compulsory so government should organise programs for this in education centres also.

14. Name the three realms of earth.

Ans.14 Three realms of earth are:-i. Lithosphere ii. Hydrosphere iii. Atmosphere.

15. State the composition of the Earth's atmosphere.

Ans.15 The atmosphere consists of a number of gases viz.78% Nitrogen, 21% Oxygen, remaining 1% Carbon dioxide and other gases like Argon, Helium etc.

16. How can we reduce global warming?

Ans.16 We can reduce global warming via such ways i.e. improvements to energy efficiency and vehicle fuel economy, increases in wind and solar power, biofuels from organic waste, setting a price on carbon, and protecting forests are all potent ways to reduce the amount of carbon dioxide and other gases trapping heat on the planet.

B. Define the following terms:-

1. Troposphere:-The troposphere is the lowest layer of Earth's atmosphere and site of all weather on Earth. The troposphere is bonded on the top by a layer of air called the tropopause, which separates the troposphere from the stratosphere, and on bottom by the surface of the Earth.

2. Stratosphere:-The stratosphere is the second major layer of Earth's atmosphere, just above the troposphere, and below the mesosphere.

3. Weather:-Weather is the state of the atmosphere, describing for example the degree to which it is hot or cold, wet or dry, calm or stormy, clear or cloudy. ... Weather refers to day-to-day temperature and precipitation activity.

4. Greenhouse Effect:-The process where bi radioactively active gases absorb and delay the loss of heat to space, thus keeping the lower troposphere moderately warmed throught the radiation and radiation of infrared wavelengths.

5. CFC:-Chlorofluorocarbons those are harmful for ozone layer.

6. Thermosphere:-Atmospheric layer of upwardly increasing temperature lying above the *Mesospause*.

C. Distinguish between the following:-

1. Troposphere and Stratosphere:-Tropopause: The upper layer of troposphere is called tropopause. It is a thin layer and its height changes according to latitudes.

Stratosphere: It extends up to the height of 50 km. The temperature remains constant up to the height of 20 km, in this layer.

2. Stratosphere and Thermosphere:-The stratosphere starts just above the troposphere and extends to 50 kilometers (31 miles) high. The ozone layer, which absorbs and scatters the solar ultraviolet radiation, is in this layer.

The thermosphere starts just above the mesosphere and extends to 600 kilometers (372 miles) high.

D. Give reasons for the followings:-

1. The layer of the atmosphere become thinner with altitude:-The gravity causes the upper layers of atmosphere to exert force on the lower ones due to their weight. This causes the air to compress and hence the air become dense at the lower level (closer to surface) while in comparison the air at heights(far from surface) is rarer or thinner.

2. The Earth does not experience extremes of temperature:-The earth does not experience extremes of temperature as on other planets due to the presence of the atmosphere. Thus, the temperature decreases with height in this layer. The stratosphere is crucial to life on the earth because the ozone layer present in it absorbs the harmful ultraviolet radiation of the sun.

3. Solid particles play an important role in the atmosphere:-Particles of dust, soil, fecal matter, metals, salt, smoke, ash and other solids make up a small percentage of the atmosphere. Particles are important because they provide starting points (or nuclei) for water vapor to condense on, which then forms raindrops.

E. Diagram:-

Draw a self- explain a tree diagram illustrating the structure of the atmosphere:-

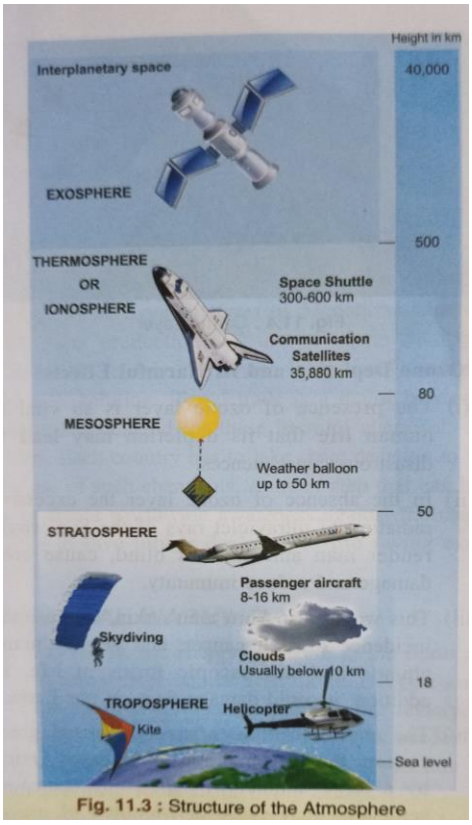

Fig. 11.3 : Structure of the Atmosphere