

## Question (2020)

Briefly describe the various segments of atmosphere. How these segments maintaining the earth radiation balance?

Answer:-

**Atmosphere:** Earth is a gaseous layer surrounding the earth. In other words we can say that our earth is surrounded by thin layer of gases called atmosphere.

→ Gases like Nitrogen 78%, Oxygen 21%, Carbon dioxide 0.03%, Nitrogen oxide and inert gases like helium, argon, Krypton and xenon constitutes 0.94%.

**Segments of Atmosphere:-**

There are five segments of atmosphere. The names of the layers in order starting from the lowest layer are;

- (i) Troposphere
- (ii) Stratosphere
- (iii) Mesosphere
- (iv) Thermosphere

## (v) Exosphere

All the names have the suffix "sphere" this is because each layer surrounds the earth.

### Troposphere:-

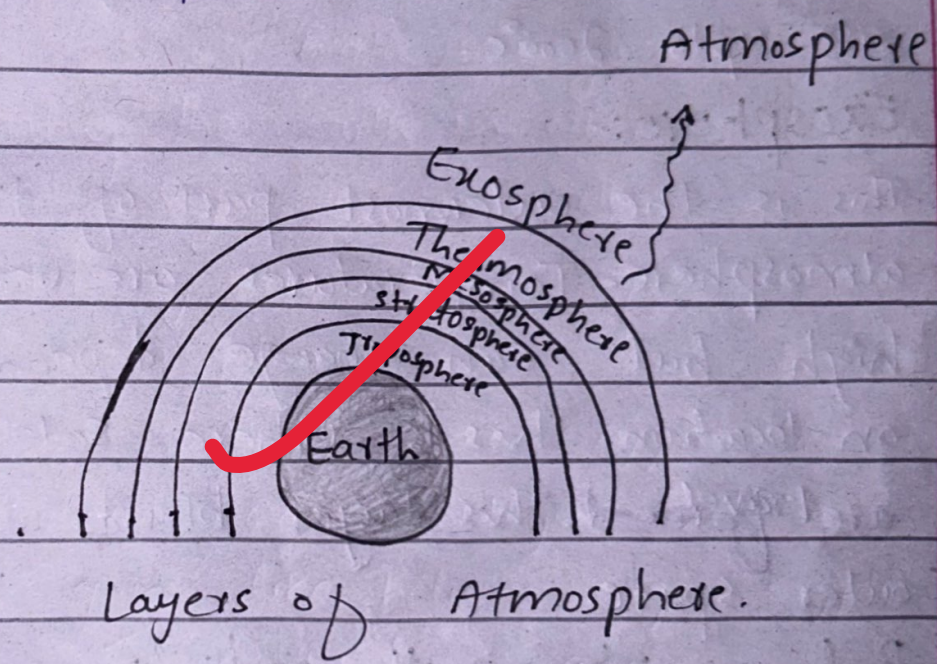
It starts at earth's surface and goes up about 12km. we live in this layer and this is where weather happens (clouds, precipitation etc); and most commercial aircraft fly in this layer. The temperature and air pressure goes decreases as you go higher in the troposphere. The temperature decreases up to  $-53^{\circ}\text{C}$ .

Tropopause is a point or region which separates the Troposphere and Stratosphere.

### Stratosphere:-

It starts at about 12km and goes to about 50km high. This layer contains the ozone layer which protects us from harmful ultraviolet radiation. ultraviolet radiation is an extreme form of heat energy. It can

damage living beings and raise earth's temperature severely. Temperature increases as you go up higher into the stratosphere. Temperature increases and comes to  $-03^{\circ}\text{C}$ .  
 Stratopause which separate the stratosphere and mesosphere.



Mesosphere :-

It is the middle layer of the atmosphere. It starts at about 50km and goes upto 80km high. Most meteor burn up in this layer, and it is the coldest layer of the atmosphere. The temperature decreases upto  $-93^{\circ}\text{C}$ , as it is the coldest layer.

## Thermosphere:-

This layer is named for its temperature. This is the hottest layer of the atmosphere. It is where auroras are formed because of the ionosphere charged particles are formed. The temperature increases with height and rise upto:  $2000^{\circ}\text{C}$ .

## Exosphere:-

This is the outermost part of the atmosphere. Temperatures are very high but can change depending on location. This is where satellites travel. This layer blends into outer space.

## Balance of earth radiation through segments:-

The radiation balance of earth is the algebraic sum of the incoming and outgoing components of radiation. The energy which is released as shortwave light and UV radiation from the sun is reflected back to space in a shorter portion as much

of this energy is absorbed by the surface of earth some of it is absorbed in the clouds.

Moreover, the atmospheric segments play a crucial role in maintaining the heat balance on earth because the ozone molecule present in the stratosphere absorb high energy ultraviolet radiations coming from the sun and convert it into both atomic and diatomic oxygen.

→ In other words, the earth is protected from uv radiations due to ozone layer present in the stratosphere.

Good attempt!