

## Gk-1

Briefly Describe the Various Segments of Atmosphere and how these Segments are maintaining the Earth Radiation Balance  
Answer

### Atmosphere:

Atmosphere is a gaseous layer around Earth. The atmosphere is a blanket of Earth, that keeps it warm and protect it from harmful solar radiation.

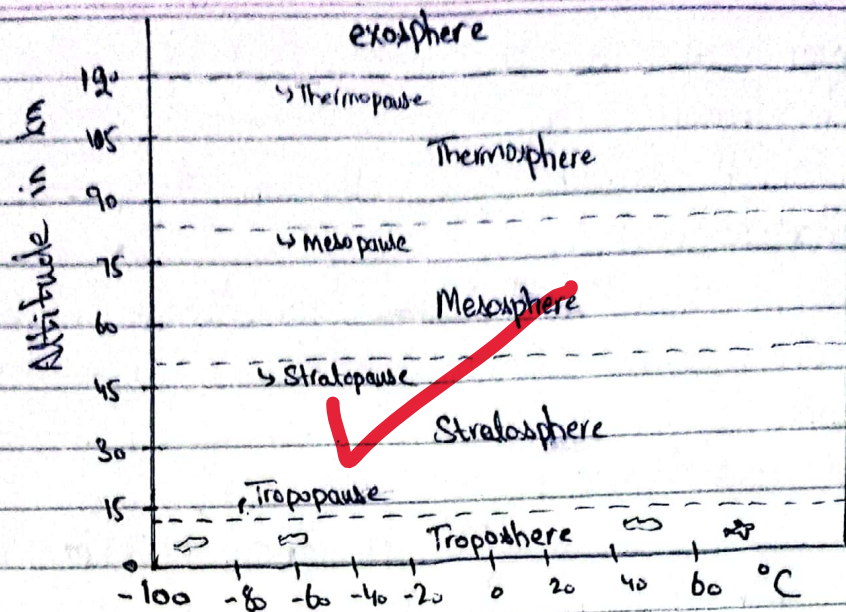
### Gases in atmosphere:

Atmosphere constitutes of two gases i.e. constant gas and variable gas. Constant gases are those whose concentration remain same and never change. Nitrogen constitutes 78.09% and oxygen 20.94%. Other constant gases include Nitrous oxide and inert gases such as argon, helium, krypton, xenon constitutes 0.94%. Variable gases are those whose concentration change from time to time and place to place. It include Carbon dioxide (0.03%), water vapour and ozone.

### Segments of Atmosphere:

Atmosphere is divided into five layers.

- 1) Troposphere
- 2) Stratosphere
- 3) Mesosphere
- 4) Thermosphere
- 5) Exosphere



## 1. Troposphere:

It is the first lowest layer of atmosphere. It starts from surface of Earth and goes up to about 12 km. It is the layer where all weather occurs (precipitation, humidity etc). Most of commercial flights fly in this layer. The temperature and air pressure decreases as you go above the layer. The temperature decreases to  $-53^{\circ}\text{C}$  as you go up.

### Tropopause:

It is the region which contains characteristics of both troposphere and stratosphere. It is the area where one layer ends and another starts.

## 2. Stratosphere:

It is next to the troposphere layer. In this layer, temperature increases as you go up. The ozone layer is found in this layer, which protects from harmful solar radiation and ultraviolet radiation. Most of jets fly in this

layer as it is most stable layer. The temperature goes to  $-0.3^{\circ}\text{C}$  in this layer. It starts from 12 km to about 50 km.

### Stratopause:

It is transition region where stratosphere ends and mesosphere starts.

### 3. Mesosphere:

It is the middle layer of atmosphere. It is the most coldest layer of atmosphere. It is layer where most of meteor burns. This layer starts from 50 km to about 80 km. Its temperature is decrease as you go above. Its temperature goes to  $-93^{\circ}\text{C}$ .

### Mesopause:

It is region where mesosphere ends and thermosphere starts as temperature become increasing.

### 4. Thermosphere:

As name indicates, it is hottest layer of atmosphere. It starts from 80 km to about 190 km. The temperature is increasing to  $2000^{\circ}\text{C}$  as you go above. It is layer where aurora can be found due to ionized atoms. The space shuttle orbits in this layer.

### Thermopause:

It is transition region where thermosphere ends and exosphere starts.

## 5. Exosphere:

It is the outermost layer of atmosphere. Its temperature is also increasing as you go up but can vary depending upon the region. It starts from 120 km and merges in space.

## How these segments maintain the Earth Radiation Balance:

Earth Radiation Balance refers to the incoming radiations from Sun such as solar radiation and UV radiation and outgoing radiation from Earth such as terrestrial radiation.

This incoming and outgoing radiation is very important in sustaining life on Earth.

Earth Radiation Balance can be checked by different factors such as radiation coming from Sun, Earth albedo (reflectivity). As all radiation coming from sun does not make it to Earth 30% of rays are reflected back to space by clouds, atmospheric gases and Earth surface and 70% reaches to Earth which helps Earth to maintain its temperature.

After that the energy absorbed by Earth tries to escape from Earth. But Earth traps it by greenhouse gases to keep itself warm. Resultantly Earth radiation

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balance is very important to protect the living being on Earth and to sustain life in Earth. A small change in balance can cause harmful effect in climate change and ecosystem.

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3) Describe the water cycle and briefly explain the major processes involved in the water cycle?

**Water Cycle:**

Water moves through hydrosphere. Water collects in clouds, and then fall on Earth in the form of rain, runoff on surface, and evaporates due to temperature and starts the cycle all over again. It is also called hydrological cycle.

The main feature of water cycle is that it never ends. Water cycle model the water storage and movement between atmosphere, biosphere, lithosphere and hydrosphere. Water has different reservoirs such as lakes, rivers, atmosphere, snowfields and groundwater. Water moves from one reservoir to another through different processes; evaporation, transpiration, condensation, precipitation, surface runoff, and infiltration.

**Evaporation:**

Evaporation is process

In which liquid, in this case water, change into gaseous state. Temperature is main factor. The water on surface like rivers, lakes, oceans became warm due to high temperature and become water vapour. The low air pressure also encourage water vapour.

### Transpiration:

As plants absorb water from soil, the water from roots through stems reaches to the leaves. The some of the water from leaves evaporates in the atmosphere. This process of evaporation from plants' leaves are called transpiration. In the forest, an enormous amount of water transpire in atmosphere.

### Condensation:

Condensation is opposite to the evaporation process. As in condensation the gaseous state is change into liquid state. Condensation is happen when the temperature of water vapour fell down. When the temperature is too low the small droplets suspended in the atmosphere. Condensation causes fog on the surface of land.

### Precipitation:

Precipitation is a process that occur when any form or all types of water

particles, such as snow, sleet, rain, and hail, fall on Earth surface.

### Surface Runoff Water:

When water falls to Earth through precipitation, it runoff on surface of land. It goes into smaller streams, then larger streams, then in rivers, and eventually, it fall in ocean. Runoff water is very important part of water cycle as large amount of water become vapour through ocean.

### Infiltration:

When water comes to Earth, the soil soaks it. The water goes to the ground and layer of rocks. Some of water then comes to the soil at springs. The water that remains underground called groundwater.

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