CLASS - X
GEOGRAPHY AND ENVIRONMENT

Chapter : Atmosphere

Topic : Composition of atmosphere, layers of atmosphere (on the basis of composition and temperature)

1. Why temperature decreases with increasing altitude in the troposphere?

Ans. In the troposphere temperature decreases with altitude at a fairly uniform rate of 6.5°C/ 1000m. This is known as the normal lapse rate of temperature. This is because :

- The earth's surface is warmed by the sun and then this energy is distributed upwards into the troposphere through mixing of the air. Since the earth's surface is the primary heat source, temperatures will be warmest at the surface and decrease away from the surface.
- When air rises it expands since the pressures are lower aloft, expanding air cools.
- Total amount of heat absorbed by rarified air in higher altitudes is less than dense air and so the temperature is lower.

2. What is Van Allen Radiation Belt?

Ans. Two giant swaths of radiation, known as the Van Allen Belts, surroundings Earth were discovered in 1958. A Van Allen radiation belt is a zone of energetic charged particles, most of which originate from the solar wind, that are captured by and held around a planet by that planet's magnetic field. In 2012, observations from the Van Allen probes showed that a third belt can sometimes appear. These belts are normally observed between 640 km to 58000 km above the Earth's surface.

The radiation recorded by Explorer-1 was humanity's first glimpse of Earth's radiation belts, two concentric rings of energetic particles surrounding the planet. The inner belt composed predominantly of protons, and the outer belt, mostly electrons. The Van Allen Radiation Belts were discovered by James Van Allen through radiation data obtained from Explorer-1.

3. What are the differences between Nacreous and Noctilucent clouds?

Ans. The differences between Nacreous and Noctilucent clouds are as follows :

Points of difference	Nacreous Clouds	Noctilucent Clouds
Location	Forms in the Stratosphere.	Forms in the Mesosphere.
Height	These are found 18 – 19 km above the sea level.	These are found 75 – 80 km above sea level.
Colour	These clouds are rainbow coloured.	These are electric blue in colour.
Ideal Condition	Nacreous clouds are formed on small, about 10 micro-metres across, ice crystals at -85°C.	Noctilucent clouds are thought to be formed on small, a mere 0.1 micro-metres across, ice-coated particles at -123°C.
Visibility	Nacreous clouds are lower than Noctilucents, so they remain visible for a shorter time after sunrise and sunset.	Noctilucent clouds are higher than Nacreous, so they remain visible for a longer time after sunrise and sunset.