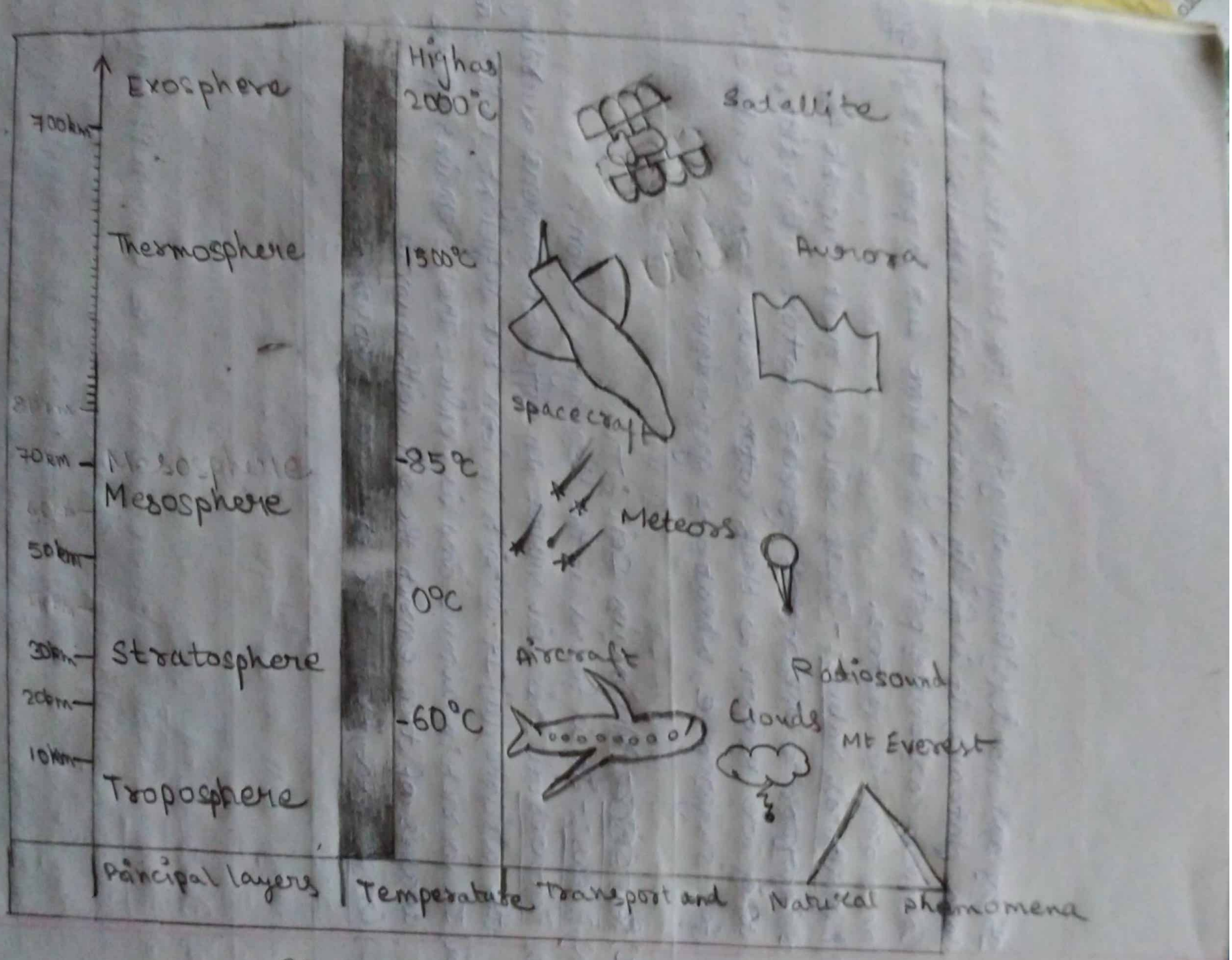

Structure of Atmosphere

Realms of the Earth Water - Land - Air

Q/A

6. Explain the layers of the atmosphere with proper diagram.

A:- Five distinct layers form the Earth's atmosphere: troposphere, stratosphere, mesosphere, thermosphere and exosphere.

Troposphere: The tropacphere starts at the Earth's surface and extends 8 (near the poles) to 14.5 (near the equator) kilometres. It is the lowest, densest and heaviest layer and comprises almost 98 percent of the total mass of the atmosphere. It absorbs maximum heat radiated from the Earth's surface, which gives rise to different weather conditions. Hence, all weather phenomena occur here. Temperature in the troposhere decrease with altitude at the rate of 1°C/165 m. This is known as the Normal Lapse Rate (NLR). The layer contains the maximum amount of oxygen and carbon dioxide in the atmosphere. Winds and the water cycle occur here. It keeps the Earth warm at night by trapping the warmth of the Sun. Tropopause is the transition zone separating this layer from the next layer, stratosphere.

Stratosphere :- The stratosphere extends up to 50 km above the Earth's surface. It is also known as ozonsphere because its lower part has high ozone concentration. The ozone layer absorbs the harmful UV rays present in sunrays, thus protecting life on Earth. The temperature here remains constant in the lower layers and increases with altitude. In the upper parts, the temperature changes steadily to reach 0°C at the stratopause. The stratopause is a transitional zone that separates the stratosphere from the mesosphere.

The stratosphere has no weather because it has no dust particles, water vapour or air current. Aeroplanes and jets fly in this zone because it is free from weather-related disturbance. Therefore, this layer is also known as the layer of calm.

Mesosphere :- The next layer, the mesosphere extends up to 85 km from the Earth's surface. The temperature in the zone decreases steadily. At the upper end of the mesospher, the temperature reaches minus sign -100°C, which is the lowest temperature as compared to other zones.

Meteors advancing towards the Earth usually burn and exhaust in this layer. These burning meteors appear to us as shooting stars. The mesopaw is a transitional zone that separates the mesosphere from the lower thermosphere.

Thermosphere :- Above the mesosphere, there is very little air. This layer is known as thermosphere because the temperature here can be as high as 1,480°C. It extends to 600 km from the Earth's surface. The upper part of this layer is called ionosphere due to the presence of electrically charged particles called irons. This layer starts at a height of 48 km from the ground and extends up till the edge of space at about 965 km. It overlaps the mesosphere and thermosphere. Irons allow the transmission and reception of communication signals between Earth and artificial satellites orbiting it in this layer. Due to the presence of irons, a pattern of differently coloured lights occurs here. These lights, known as aurora, can be seen in the night sky.

Exosphere :- The exosphere reaches up to 10,000 km above the Earth's surface and emerges with the interplanetary space. It is the outermost and thinnest layer. It absorbs UV and gamma rays coming from the Sun. The temperature in the exosphere varies greatly and can range from 0 to over 1650°C. It is colder at night and much hotter during the day.

The geocorona, a luminous sphere that glows around the Earth when viewed from outer space, is a part of this layer.

2) Write short notes on :-

(a) Lithosphere :- The surface of the land consists of rocks and soils. This part of the environment is called the Lithosphere meaning a layer of rocks.

(b) Hydrosphere :- Water also occurs on the land and in the atmosphere as water vapour. This realm of water is called the Hydrosphere.

(c) Atmosphere :- There is an envelope of air around the Earth. This is called the Atmosphere.

(d) Biosphere :- The narrow zone of contact between the land (lithosphere) water (hydrosphere) and air (atmosphere) is the biosphere. It is in this zone that life, that is unique to this planet, exists. Bios is an ancient Greek word meaning 'life'. Life is biosphere is possible only because of a proper balance between land, water and air. Life exists on and in the ground (land), in water and in air, the biosphere can be defined as the relatively narrow belt of living organisms found a little above the surface and a little below the surface of the Earth.

e) Blue Planet :- The earth is commonly known as the blue planet. More than 71 per cent of its is covered with water and 29 per cent is covered with land.

(f) Humidity :- The amount of water vapour present in the air determines the humidity of the air. It varies from time to time and from place to place. Humidity decreases with height in the troposphere because water enters the atmosphere through evaporation from the Earth's surface. Higher the temperature, faster is the rate of evaporation.

(g) photosynthesis :- The process by which green plants and some other organisms use sunlight, with carbon dioxide and water making their own food.

(h) global warming :- The burning of fossil fuels (coal, gas, petroleum) the cultivation of soil, large scale industrialisation, rapid means of transport and deforestation has raised the average temperature of the earth by 0.5°C.

(i) Pangaea :- 500 million years ago, the world map was not as it is today. There was one huge integrated landmass or mother-continent called the Pangaea.

(j) Continent :- Landmasses of large extent are called the continent. There are seven continent of the earth.

These are Asia, Africa, Europe, North America, South America, Australia and Antarctica.

(k) Panthalassa :- The Pangaea was surrounded by the gigantic water body or Super Ocean called the Panthalassa.

(l) Enviroment :- Enviroment refers to the surrounding of a place. The enviroment includes land, water and air and living objects like plants, animals and humans. Both living and non-living objects are dependent on one another. Our enviroment consists of four realms or parts. They are lithosphere, Hydrosphere, Atmosphere and Biosphere.

(m) Gulf :- A deep inlet of the sea almost surrounded by land with a narrow mouth is called a gulf.

(n) Bay :- A bay is wide covering 'indentation' in a coastline.

(o) Strait :- A strait is a narrow passage of water that connects two large navigable bodies of water.

(p) Isthmus :- An isthmus is a narrow strip of land joining two large landmasses or separating two large water bodies.

(q) Frozen continent :- Antarctica is entirely in the Southern

Hemisphere. It is frozen land found around the south pole. It contains 75% of the ice in the world. It is estimated that ice is about 4km thick. Hence, Antarctica is called the "Frozen Continent."

(2) Ozonsphere:- This is a zone of ozone gas. It absorbs ultra-violet rays of the Sun. It has high temperature. Due to excessive use of chemicals and carbon, the ozone layer being depleted.

(3) Name the oceans.

Ans:- There are five oceans. These are the Pacific Ocean, the Atlantic Ocean, the Indian Ocean, the Arctic Ocean and the Antartica Ocean.

(4) Name the continents.

Ans:- There are seven major continents. These are - Asia, Africa, North America, South America, Europe, Australia and Antartica.

(5) Why is life possible on the earth?

Ans:- The earth is a unique planet. It has plenty of water. The earth has air. Oxygen and Nitrogen gases support life. All kinds of life depend upon

water and air. First life on earth evolved in the water

(5) Why is the Biosphere important for living organism?

A:- Life exists in Biosphere. All the living organisms are interlinked for their survival. It consists of plants and animals. In this sphere of life, lithosphere, atmosphere and hydrosphere meet.

(7) How are oceans useful to us?

A:- (i) Oceans modify land temperature. (ii) Oceans are source of water vapour that causes rainfall. (iv) Oceans are means of transport.

(8) Why is the earth considered a unique planet?

A:- Our earth is considered a unique planet in the Solar System because this is the only planet where life is possible. The environmental conditions are favourable for the origin of life.