1. Sun : The Ultimate Source

Let us Assess

1. Question

Explain how latitudinal location influences distribution of temperature on earth.

Answer

Latitude refers to the distance between the locations on the earth from the equator. The land nearer to the latitude receives more sunlight as compare the land away from the equator. This is the reason the sunlight is extreme in the location nearer to the equator. **Tropical regions experience more sunlight because rays of the sun are vertical thus receives more energy**. On reaching close to the poles the angle of incidence of the sun's rays becomes more slanting. Due to this, there is a loss of energy because the sun has to travel through the atmosphere more.

NOTE – Tropical regions refers to the area nearer to the equator.

2. Question

The isotherms in the northern hemisphere are more curved while those in the southern hemisphere are almost parallel to the Equator. Why?

Answer

Temperature is higher over the land as compared to the sea during the summer time. The situation becomes the opposite during the winter time. So, the isotherms bend based on the difference in heating of land and water.

3. Question

Suppose the relative humidity is 100%. Write your inferences regarding the atmospheric condition.

Answer

Relative humidity is defined as the ratio between the amount of water vapour and the total water holding capacity of the atmosphere. It is measured with the instrument called wet and dry bulb thermometer. If the relative humidity is 100%, it means that the absolute humidity is equal to the total water holding capacity at a particular temperature. Absolute humidity is the definite amount of water present in the atmosphere. So, when the atmosphere is fully saturated than condensation begins which results in the form of Frost, Mist/Fog, Dew and clouds.

Constant condensation results in the droplets present in the clouds to grow bigger in size. Due to this water droplets releases from the clouds and fall on the earth when it is not able to withstand the gravitational force of the earth.

4. Question

Differentiate between

(a) Dew and frost

(b) Fog and mist

Answer

(a)

Dew	**Frost**
During the night, the temperature falls down to the extent that it cools down the surface of the earth and the near atmosphere. Water vapour turns into a liquid form and stick to the cold surfaces. This is how the formation of the dew happens.	The process of formation of Frost is similar to Dew. In some places, the temperature falls below the 0 degree Celsius, at that time the water vapour turns into tiny ice crystals.
For example – the water droplet sticking on to the blades of grass. It disappears when the sun rises.	For example – Tiny ice crystals on the leaves of the plants or tree.

(c)

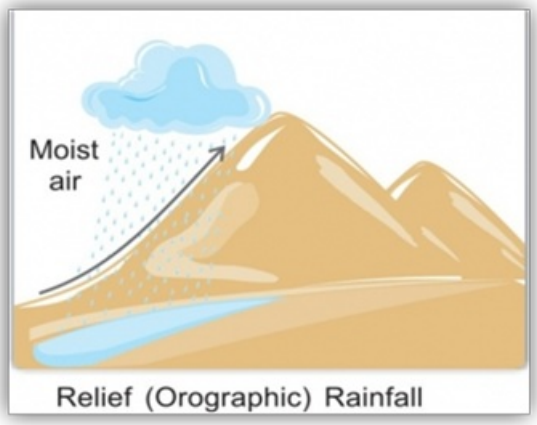
Fog	Mist
During the winter season, the air cools down the condensed tiny droplets of water which remains in the atmosphere itself which leads to the formation of Fog.	The process of formation of Mist is similar to that of Fog. Mist (or Fog) is formed when condensation takes place around the tiny dust particles present in the lower atmosphere.
This causes hindrance in atmospheric visibility. Thus, if the atmospheric visibility ranges less than one kilometre is fog.	This causes hindrance in atmospheric visibility. Thus, if the atmospheric visibility ranges more than one kilometre is mist.

5. Question

Illustrate the concept of Orographic rainfall with the help of a diagram.

Answer

The wind filled with moisture from the sea enters into the land. Gradually, it moves upwards through the mountain slopes and cools down there. After condensing it led to the formation of clouds.



The windward side as shown in the figure receives heavy rainfall whereas the other side or the leeward side does not receive rainfall. It is because on the leeward side the dry air is descending. The leeward side which does not receive rainfall is also known as rain shadow regions. This type of rainfall is known as orographic rainfall or relief rainfall.

Extended Activities

1. Question

Illustrate heat budget on a chart paper and display it in the class.

Answer

The term heat budget refers to the balance between insolation and terrestrial radiation.

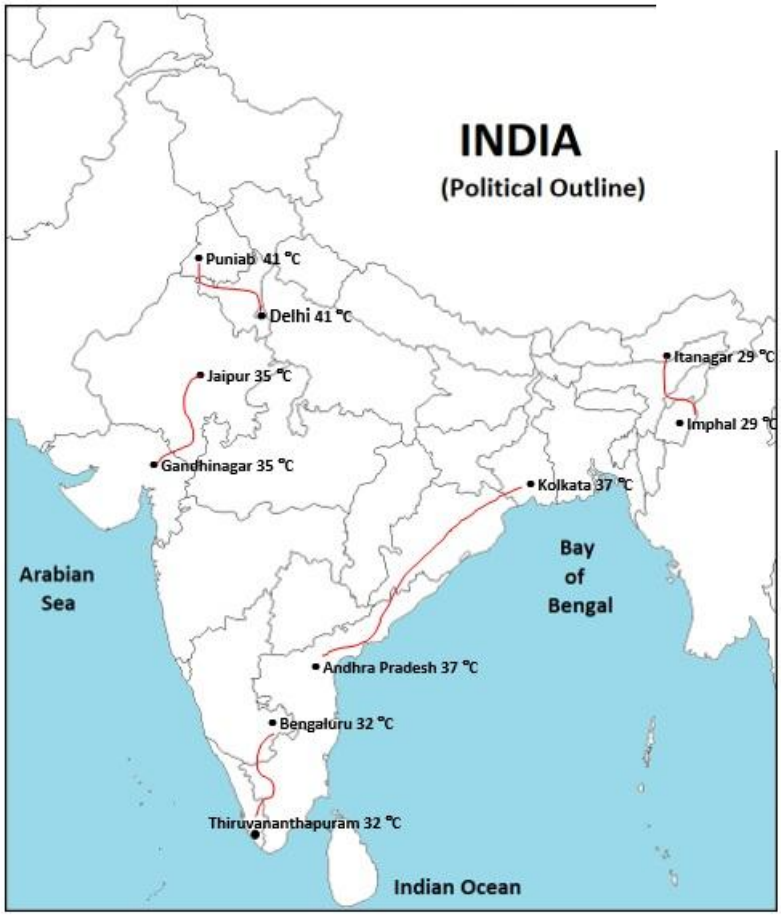
Shown below is the heat budget – consider that total amount of insolation = 100 units. It is reaching on the outer surface of the atmosphere. Now let us see how these 100 units of energy are distributed.

This is the total amount of energy reflected by the atmospheric particles and earth's surface.	35 units	17 units = Direct terrestrial radiation
This amount of energy is reaching on the earth.	51 units	48 units = Radiation from the atmosphere
This amount of energy is held by the atmosphere.	14 units	
This is total amount of energy receives by the atmosphere and earth’s surface.	65 units	65 units – this is the total amount of energy received back from the surface of the earth and the atmosphere.

2. Question

Mark the temperature of different cities in India on a map and draw isotherms by connecting the points suitably.

Answer



3. Question

Observe the functions of weather instruments by visiting a nearby weather station.

Answer

In the weather station, various instruments are used such as Maximum-minimum thermometer, Wet and dry bulb thermometer, Barometer, anemometer, etc. The various functions of the weather instruments are as follows:

• Weather instruments are used **to measure maximum and minimum temperature per day** and also overall **atmospheric temperature**.

• **The relative humidity is calculated.**

• **To measure air and sea surface temperature.**

• **To measure atmospheric pressure.**

• **To measure wind speed and direction.**

• **To measure the amount of rainfall.**

4. Question

Observe the sky and identify the clouds based on their forms.

Answer

When condensation of water vapour happens around the dust particles present in the atmosphere, clouds are formed. Water droplets which formed are less than 0.001 cm in dimension. Clouds are classified based on their height and form which are as follows:

• **Cirrus clouds** – this type of clouds is present in the upper atmosphere when the weather is clear. These are the feather-like clouds.

• **Stratus Clouds** – this type of clouds is present in the lower part of the sky which is in a thick layer.

• **Cumulus clouds** – this type of clouds looks like the huge cotton bundles. These are formed by the strong convection currents and have large vertical coverage.

• **Nimbus clouds** – this type of clouds appear as dark rain clouds present in the lower atmosphere. Nimbus clouds didn't allow sunlight to pass through them as the concentration of water droplets is thick.

Clouds appear in different forms at the same time, for example - cumulus and nimbus clouds appear together is termed as cumulo-nimbus clouds.

5. Question

Prepare a maximum number of objective questions based on this unit and conduct a quiz competition in the

class.

Answer

QUIZ COMPETITION

Ques. Name the term used to refer to the degree of hotness of the atmosphere.

Ans: Temperature.

Ques. Heat budget is the balance between

Ans: Insolation and terrestrial radiation.

Ques. The average temperature of a day is termed as?

Ans: 'Daily mean temperature'.

Ques. The difference between the maximum and minimum temperatures in a day is called?

Ans: Diurnal range of temperature.

Ques. Name the instrument used for measuring the maximum and minimum temperature in a day.

Ans: Maximum-minimum thermometer.

Ques. If isotherms are plotted by connecting the places having the highest temperature on earth, it will run almost parallel to the equator. Such an imaginary line is called.

Ans: Thermal equator.

Ques. Water content in the atmosphere is called.

Ans: Humidity

Ques. How to measure absolute humidity?

Ans: It is measured as the amount of water vapour present per cubic metre volume of air (g/m^3).

Ques. How many thermometer wet and dry bulb thermometer consists of?

Ans: Two

Ques. In some instances, due to rapid fall in atmospheric temperature, water vapour directly condenses to solid state (snowflakes), this is referred to as

Ans: Sublimation

Ques. Name the different forms of condensation.

Ans: Frost, Clouds, Mist/Fog and Dew.

Ques. Name the four different types of clouds.

Ans: Cirrus clouds, Stratus clouds, Nimbus clouds and Cumulus clouds.

Ques. Name the four different types of clouds based on altitude.

Ans: High clouds (20000 to 40000 ft), Medium clouds (7000 to 20000 ft), Low clouds (< 7000 ft) and Clouds with great vertical extent (2000 to 30000 ft).

Ques. When the temperature falls below 0° Celsius, the precipitation reaches the earth in the form of tiny crystals of ice, this is referred to as

Ans: Snowfall

Ques. Name the different types of rainfall.

Ans: Orographic rainfall, Convectional rainfall and border rainfall.