Que.1. Study the spacing of isotherms in the given map and list out the characteristics.

[Marks :(3)]



Ans. The range of temperature between January and July. The highest range of temperature is more than 60° C over the north-eastern part of Eurasian continent. This is due to continentality. The least range of temperature, 3°C, is found between 20° S and 15° N.

Que.2. It is observed that, on temperature, the effect of landmass is well pronounced in the northern hemisphere while that of ocean is more in the southern hemisphere. Analyse.

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[Marks :(2)]
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Ans. In the northern hemisphere the land surface area is much larger than in the southern hemisphere. Hence, the effects of land mass and the ocean currents are well pronounced.

Que.3. What are the factors resulting in the variability of temperature at Delhi and Chennai on the same day?

[Marks :(3)]

Ans. (i) the latitude of the place; (ii) the altitude of the place; (iii) distance from the sea, the airmass circulation; (iv) the presence of warm and cold ocean currents; (v) local aspects.

Que.4. When we analyse the temperature data of different places for the same date, a marked difference is visible between these places. List out the factors causing it.

[Marks :(3)]

Ans. (i) the latitude of the place; (ii) the altitude of the place; (iii) distance from the sea, the airmass circulation; (iv) the presence of warm and cold ocean currents; (v) local aspects.

Que.5. Why does only 51% of the total insolation reach the surface of the earth?

[Marks :(3)]

Ans. Among the 100 units of insolation, roughly 35 units are reflected back to space even before reaching the earth's surface. 14 units are absorbed by the atmosphere. Hence, only 51% of the total insolation reach the surface of the earth.

Que.6. Analyse the figure and make a description on the latitudinal variation in net radiation balance.

[Marks :(3)]



Ans. The figure shows that there is a surplus of net radiation balance between 40 degrees north and south and the regions near the poles have a deficit. The surplus heat energy from the tropics is redistributed pole wards and as a result the tropics do not get progressively heated up due to the accumulation of excess heat or the high latitudes get permanently frozen due to excess deficit.

Que.7. Analyse the amount of heat energy received and lost by the earth's atmosphere from the given illustrations.



[Marks :(5)]

Ans. Consider that the insolation received at the top of the atmosphere is 100 per cent. While passing through the atmosphere some amount of energy is reflected, scattered and absorbed. Only the remaining part reaches the earth surface. Roughly 35 units are reflected back to space even before reaching the earth's surface. Of these, 27 units are reflected back from the top of the clouds and 2 units from the snow and ice-covered areas of the earth. The reflected amount of radiation is called the albedo of the earth.

The remaining 65 units are absorbed, 14 units within the atmosphere and 51 units by the earth's surface. The earth radiates back 51 units in the form of terrestrial radiation. Of these, 17 units are radiated to space directly and the remaining 34 units are absorbed by the atmosphere. 48 units absorbed by the earth (14 units from insolation , +34 units from terrestrial radiation) are also radiated back into space. This is termed the heat budget or heat balance of the earth.

Que.8. Choose the correct explanation

[Marks :(2)]

A	В
Albedo	Temperature increases with increase in height
2 Inversion of temperature	Lines joining places of temperature
3 Advection	Amount of visible radiation reflected by the Earth
4 Isotherm	Horizontal transfer of heat

Ans. 1 - Amount of visible radiation reflected by the Earth

- 2 Temperature increases with increase in height
- 3 Horizontal transfer of heat
- 4 Lines joining places of temperature

Que.9. The atmosphere is heated by terrestrial radiation and not by insolation. Examine.

[Marks :(2)]

Ans. Insolation reaches the earth's surface in short waves and heat is radiated from the earth in long waves. Hence terrestrial radiation heats up the atmosphere more than insolation.

Que.10. Wearing more layers of clothes during winters keeps us warmer than wearing one thick piece of clothing. Find the reason for this, keeping in mind the different ways of heat transfer.

[Marks :(3)]

Ans. During winters, we prefer wearing more layers of clothing than just one thick piece of clothing because air gets trapped in between the various clothing layers. Being a poor conductor of heat, air prevents heat loss from our body. Hence, layers of clothing keep us warmer than a single layer by overcoming the transfer of heat through conduction.

Que.11. Identify the type of heat transfer which leads to the formation of the local wind, "Loo" during summer season.

[Marks :(1)]

Convection Advection Conduction Radiation Ans. Advection Que.12. On June 21, the length of the day is 12 hours at:

Tropic of Cancer
North pole
Equator
Tropic of Capricorn

Ans. Equator

Que.13. The amount and intensity of insolation vary from place to place and from time to time. List out the factors causing this variability.

Ans. (i) the rotation of earth on its axis; (ii) the angle of inclination of the sun's rays; (iii) the length of the day; (iv) the transparency of the atmosphere; (v) the configuration of land in terms of its aspect.

Que.14. Why is India cooler in December than in July?

Ans. During the month of December, the Sun's rays hit the Earth at a shallow angle due to the tilt of its axis and also the longer nights in India prevent the surface from warming up. That is why December is cooler than July in India.

Que.15. At the same latitude, insolation is more over the continent than the oceans. Give reasons.

Ans. At the same latitude the insolation is more over the continent than over the oceans because the clouds over the oceans reflect more sun rays back into space.

Que.16. The position of the earth nearest to the sun is known as:

[Marks :(1)]

Ans. Perihelion

Aphelion

Equinox

Solstice

Perihelion

Que.17. On which day, the position of earth is farthest from the sun?

3rd January

4th July

[Marks :(2)]

[Marks :(2)]

[Marks :(1)]

[Marks :(3)]

4th January

3rd June

Ans. 4th July

Que.18. The amount of insolation received at the top of the atmosphere is:

320 W/m²

1.94 Calories/cm²/minute

70 W/m²

Ans. 1.94 Calories/cm²/minute

Que.19. The solar output received at the top of the atmosphere varies slightly in a year. Analyse the statement

(Hint: aphelion, perihelion)

[Marks :(3)]

[Marks :(1)]

Ans. The solar output received at the top of the atmosphere varies slightly in a year due to the variations in the distance between the earth and the sun. During its revolution around the sun, the earth is farthest from the sun (152 million km on 4th July). This position of the earth is called aphelion. On 3rd January, the earth is the nearest to the sun (147 million km). This position is called perihelion. Therefore, the annual insolation received by the earth on 3rd January is slightly more than the amount received on 4th July.

[Marks :(1)]