Board – CBSE	Class – 7	Topic – Heat

1. State similarities and differences between the laboratory thermometer and the clinical thermometer.

   Ans. Similarities:

   (i) Both thermometers consist of long narrow, uniform glass tubes.

   (ii) Both have a bulb at one end.

   (iii) Both contain mercury in the bulb.

   (iv) Both use the Celsius scale on the glass tube.

   Differences:

   (i) A clinical thermometer reads temperature 35°C to 45°C while the range of laboratory thermometer is -10°C to 110°C.

   (ii) Clinical thermometer has a kink near the bulb while there is no kink in the laboratory thermometer.

   Due to kink, mercury does not fall on its own in clinical thermometers.

2. In places of hot climate, it is advised that the outer walls of houses be painted white. Explain.

   Ans.

   In places of hot climate, it is advised that the outer wall of houses be painted white because white colour reflects heat and the houses do not heat up too much

3. Discuss why wearing more layers of clothing during winter keeps us warmer than wearing just one thick piece of clothing?

   Ans.

   More layers of clothing keep us warm in winters as they have a lot of space between them. This space gets filled up with air. Air is a bad conductor. It does not allow the body heat to escape out.

4. What is a sea breeze?

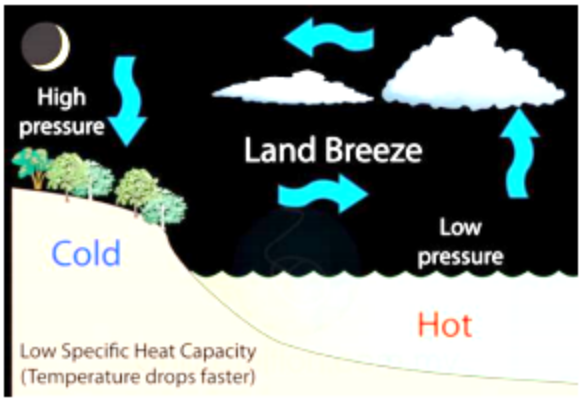
   Ans:

   This is a phenomenon observed in coastal areas. During the day, the land gets heated faster than the sea. Therefore the air over the land heats up, expands and rises. The cooler air from the sea rushes in to occupy the vacuum left behind. As a result, the land air moves towards the sea. The breeze that flows towards land from the sea during the day is called a sea breeze. In coastal areas, houses are designed such that the windows always face the sea to receive maximum sea breeze.

5. What is a land breeze?

   Ans:

   This is a phenomenon observed in coastal areas. At night, the land cools down faster than the water in the sea. Therefore, the air above the land cools down faster. The air above the sea remains warm, expands and rises. Air from land rushes in to occupy the vacuum. The breeze that flows towards the sea from land at night is called a land breeze.



6. How does wearing woollen clothes keep us warm in winters?

   Ans:

   Woollen clothes are ideal for winter as they keep us warm.

   i) Wool is a poor conductor of heat, so it doesn't conduct body heat.

   ii) Air trapped between the pores of the woollen fibres is also a poor conductor of heat. This further prevents the flow of heat from the body to the surroundings.

Since body heat remains trapped within the layers of fabric, we feel warm. Additionally, layering up with multiple layers of fabric is better than wearing one thick woollen fabric. This is because air is trapped between each layer, and thus, more heat remains trapped. We, therefore, feel warmer.

7. What is conduction?

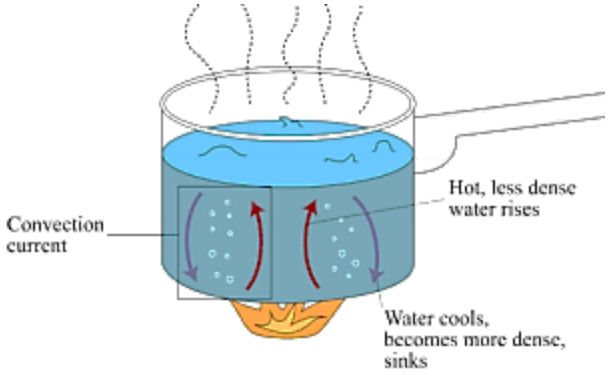
Ans:

The transfer of heat from one object to another point through direct contact is called conduction. This is because the materials between which heat transfer is occurring are in direct contact with each other. Therefore, the hot object will transfer heat to the adjacent object directly in contact with it. So the process continues for as long as there are objects in contact. It is the most common method of heat transfer in solids.

8. What is convection?

Ans:

Convection is a mode of heat transfer seen in fluids such as liquids and gases. In this method, the fluid is heated unevenly. A portion of fluid becomes hot, expands and rises. Then, colder fluids from the surrounding areas rush in to occupy the space vacated by the rising hot fluid. They get heated in turn, and the whole process is repeated until the whole fluid heats up. Convection is the phenomenon responsible for winds and storms.



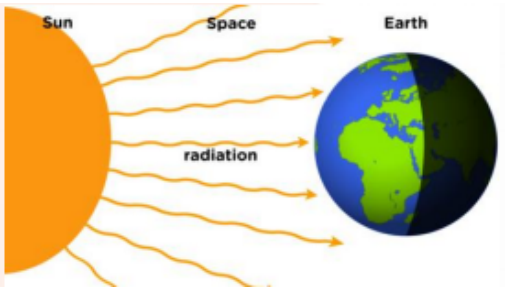
9. What are insulators?

   Ans:

   Insulators are materials that are extremely poor in the conduction of heat. As a result, these materials do not allow heat to conduct through them easily. Insulators are therefore used to make handles of cooking pots and pans to hold the same without burning ourselves. Plastic, wood, rubber are examples of insulators.

10. What is radiation?

    Ans:



    Transfer of heat between objects that are no directly in contact is called radiation. The tw objects may be solids or fluids but are not in contact with each other. Transfer of heat occurs from a distance as the hot object radiates heat into the surroundings. Radiation does not require any medium. A hot object cools down on its own because it radiates heat to the surroundings.

11. At a campsite, there are tents of two shades. One made with black fabric and the other with white fabric. Which one will you prefer for resting on a hot summer afternoon? Give reason for your choice. Would you like to prefer the same tent during winter?

    Answer:

    We prefer a white fabric tent in summer because it reflects all the radiations from the sun and keeps us cool inside the tent.

    No, in the case of winter, we should use a black fabric tent as it absorbs all colours of light from the sun and keeps us warm inside the tent.

12. For setting curd, a small amount of curd is added to warm milk. The microbes present in the curd help in setting if the mixture's temperature remains approximately between 35°C to 40°C. At places where room temperature remains much below the range, the setting of curd becomes difficult. Suggest a way to set curd in such a situation.

    Answer:

    For the setting of curd at places where the temperature is below room temperature, the container in which curd is to be made must be kept in a thermally insulated cover, or it can be wrapped either by a woollen material or a jute sack so that temperature is maintained for the setting of curd.

    The container can also be kept in the sun or near the gas stove while cooking food for the setting of curd.

13. To keep her soup warm, Paheli wrapped the container, in which it was kept a woollen cloth. Can she apply the same method to keep a glass of cold drink cool? Give a reason for your answer.

    Answer:

    Yes, she can apply the same method to keep a glass of cold drink cool because wool is a thermal insulator, and it cannot allow heat to pass through it.

14. Why can't we use a laboratory thermometer to measure human body temperature?

    Ans.

    We can't use a laboratory thermometer to measure human body temperature because a laboratory thermometer's range is generally high, from –10°C to 110°C. In contrast, the normal body temperature of the human body is 37°C. Moreover, a laboratory thermometer does not have a kink, so the mercury falls on its own upon removing it from the body orifice. Thus, it does not give the accurate temperature of the human body.

15. Write three precautions in using a laboratory thermometer.

Ans :

The precautions needed while reading a laboratory thermometer are:

1. It should be kept upright, not tilted.
2. Bulb should be surrounded from all sides by the substance the temperature is to be measured.
3. The bulb should not touch the surface of the container.