**L-3 Heat**

**Answer the following questions in brief**

**Q.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 bulb.
(iv) Both use 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 down on its own in clinical thermometer.

**Q.2. Give two examples each of conductors and insulators of heat.**
**Ans.** Conductors—aluminium, iron Insulators—plastic, wood.

**Q.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.

**Q.4. 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 be

cause white colour reflects heat and the houses do not heat up too much.

**Q.5.Write the names of the most commonly used temperature scales.**

**Ans)** Degree Celsius, Degree Fahrenheit and Kelvin are the most commonly used temperature scales.

**Q.6. Why is mercury preferred as thermometric liquid?**

**Ans)** • Mercury is a shiny, opaque substance which is easily visible.

• Mercury has a uniform expansion for a wide range of temperature.

• It has a high boiling point (357 °C) and a low freezing point (–39 °C). So, it can be used to measure a wide range of temperatures.

• Mercury, being a metal, is sensitive to small changes in temperature.

• Mercury does not stick to glass and so measures the temperature accurately.

**Q.7. Why does the capillary of a clinical thermometer have a kink?**

**Ans)** The capillary of a clinical thermometer has a kink so that the mercury that has risen does not fall back into the bulb on its own. This helps in taking an accurate measurement of temperature.

**8. Explain why you would not use;**

**i) A laboratory thermometer for measuring your body temperature**

**Ans)** A laboratory thermometer cannot be used for measuring the human body temperature as it does not have a kink in its capillary, and so the mercury will fall back into the bulb as soon as the thermometer is removed from the patient’s body. So, it will be difficult to measure temperature accurately.

 **ii) A clinical thermometer for measuring the temperature of hot milk**

**Ans)** A clinical thermometer can measure temperature in the range of 35°C to 42°C. But the temperature of hot milk is much more than 42°C (The boiling point of milk is 100°C.) and so a clinical thermometer will not be able to measure correctly the temperature of hot milk. Also, if the milk happens to be too hot, the thermometer might break.

**Q.9 Give reason**

 **a)It saves fuel if we cook food in a vessel which is blackened at the bottom and polished from the sides.**

**Ans**) Blackened-bottom utensils absorb more heat from the flame as black surfaces are good absorbers of heat. The sides are made shiny as shiny surfaces are good reflectors of heat, and so reflect most of the heat towards the food being cooked. Both these steps help in cooking the food faster, thus saving time and fuel.

**b) Birds puff up their feathers in winter.**

**Ans**) Puffing up the feathers traps air. Since air is a good insulator of heat, it does not allow the bird’s body heat to escape, thereby keeping the bird warm

**Q.10. a)Convert 50oF to oC b) Convert 110 0 C to F c) Convert 131oF to oC**

 **d) Convert 85 0 C to F**

**Answer the following questions in detail**

**Q1.Differentiate between conduction, convection and radiation.**

**Ans)**

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| --- | --- | --- |
| **Conduction** | **Convection** | **Radiation** |
| It is the process of transfer of heat in which two objects have to be in contact and at different temperatures. | It is the process of transfer of heat where there is actual movement of molecules from the hotter region to the colder region. | It is the process of transfer of heat even in the absence of a material medium. |
| It takes place when molecules vibrate and transfer their energy to the neighboring molecules. The process continues till the entire object is heated and has reached the same temperature. | It takes place by actual movement of molecules from the hotter region to the colder region. | It does not necessarily require a material medium. The heat is transferred by rays. |
| It takes place in solids. | It takes place in fluids— liquids and gases. | It can take place even in a vacuum. |

**Q2. Depict the application of convectional currents in land and sea breezes with the help of neat and labelled diagrams.**

**Ans)**

