3 Heat

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

Similarities:

- Both are used to measure temperature.
- Both contain mercury and have a glass tube with a scale.

Differences:

Feature	Clinical Thermometer	Laboratory Thermometer
Use	Used to measure human body temperature	Used to measure temperature of other substances
Range	35°C to 42°C	–10°C to 110°C
Kink	Has a kink to prevent mercury from falling back	No kink
Reading	Can be read after removal from the body	Must be read while in the substance

Que 2. Give two examples each of conductors and insulators of heat.

- Conductors: Copper, Iron
- Insulators: Plastic, Wood

Que 3. Fill in the blanks

(a) The hotness of an object is determined by its temperature.

(b) Temperature of boiling water cannot be measured by a clinical thermometer.

(c) Temperature is measured in degree Celsius.

(d) No medium is required for transfer of heat by the process of radiation.

(e) A cold steel spoon is dipped in a cup of hot milk. Heat is transferred to its other end by the process of conduction.

(f) Clothes of dark colours absorb more heat better than clothes of light colours.

Que 4. Match the following

Column A	Column B
(i) Land breeze blows during	(a) summer
(ii) Sea breeze blows during	(b) winter
(iii) Dark coloured clothes are preferred during	(c) day
(iv) Light coloured clothes are preferred during	(d) night

Que 5. Why wearing more layers of clothing during winter keeps us warmer than one thick piece of clothing?

Answer: More layers trap air between them. Since air is a poor conductor of heat, it prevents the loss of heat from the body and keeps us warmer.

Que 6. Look at Fig. Mark where the heat is being transferred by conduction, by convection and by radiation.

Conduction: Heat transfer from the flame to the pan through the metal base.
Convection: Heat circulation in water inside the pan.
Radiation: Heat coming from the flame to the pan and surrounding air without touching (in the form of rays).

Que 7. Why is it advised that the outer walls of houses be painted white in hot climates?
Answer: White reflects most of the heat from sunlight and absorbs very little. This helps in keeping the house cooler in hot climates.

Que 8. One litre of water at 30°C is mixed with one litre of water at 50°C. The temperature of the mixture will be
Answer: (d) between 30°C and 50°C

Que 9. An iron ball at 40°C is dropped in water at 40°C. The heat will
Answer: (b) not flow from iron ball to water or from water to iron ball.

Que 10. A wooden spoon is dipped in ice cream. Its other end
Answer: (d) does not become cold. (Because wood is an insulator and does not allow heat to transfer easily.)

Que 11. Stainless steel pans are usually provided with copper bottoms because
Answer: (c) copper is a better conductor of heat than the stainless steel.

Extended Learning – Activities and Answers

1. Observation at the Doctor's Clinic

(a) The thermometer is dipped in a liquid (usually antiseptic) to clean and disinfect it.
(b) It is kept under the tongue because it provides a close estimate of the core body temperature.
(c) Yes, but other places like the armpit may not give accurate readings.
(d) No, the temperature of different parts of the body may differ slightly.

– Why is digital thermometer preferred today?
Answer: Digital thermometers are safer (no mercury), more convenient (digital display - easy and accurate to read), and environmentally friendly compared to mercury thermometers

2. Observation at the Veterinary Clinic

Normal temperature of domestic animals:
Cow: Around 38.6°C to 39.3°C
Dog: Around 38.3°C to 39.2°C
Cat: Around 38.6°C to 39.2°C
Birds (e.g. hens): Around 40°C to 43°C

3. Paper strip activity around iron rod

Observation:
The paper does not burn while rotating the rod.

Explanation:
The heat is spread over a large area due to rotation, and no single point gets hot enough to ignite the paper.