

CHAPTER - 3

TEMPERATURE AND ITS MEASUREMENT

↙ VERY SHORT ANSWER TYPE:

5. Give me one condition for that heat to flow between the two bodies.

Ans: Heat always flows from the hotter body to the colder body.

11. Convert 55°F to $^{\circ}\text{C}$

Ans: Formula: $C = (F - 32) \times \frac{5}{9}$
 $= (55 - 32) \times \frac{5}{9}$
 $= 23 \times \frac{5}{9}$

$$55^{\circ}\text{F} = 12.8^{\circ}\text{C}.$$

12. What is the relation between Celsius and Kelvin scales?

Ans: RELATIONSHIP BETWEEN C AND F SCALES:

$$K = ^{\circ}\text{C} + 273$$

(or)

$$^{\circ}\text{C} = K - 273$$

EXAMPLES:

$$0^{\circ}\text{C} = 273 \text{ K}$$

$$100^{\circ}\text{C} = 373 \text{ K}$$

$$25^{\circ}\text{C} = 298 \text{ K}$$

↘ SHORT ANSWER TYPE:

2. What are the precautions should we take while using a clinical thermometer?

Ans: (i) The reading should be taken by keeping the level of mercury along the line of sight.

(ii) Before use, the mercury level should be below 35°C

(iii) Wash the thermometer with water or an antiseptic solution before and after use.

(iv) Never hold the thermometer by the bulb while reading it.

(v) Handle the thermometer with care, it can break if hit against hard object.

3. Explain an activity to show how to measure temperature of water with laboratory thermometer.

Ans: Take a water in a beaker and place a laboratory thermometer in it. Ensure that the bulb is completely immersed but, does not touch the sides or bottom. Wait until the mercury level becomes steady and note the reading while keeping your eye level with the mercury column.

4. Why boiling water is not used to sterilize a clinical thermometer?

Ans: Boiling water is not used to sterilize a clinical thermometer because a clinical thermometer is designed to measure temperature only upto about 42°C . Boiling water is at about 100°C , which can damage the thermometer.

6. The temperature of a copper bar is 50°C . Find its temperature in Fahrenheit ($^{\circ}\text{F}$) and Kelvin (K).

ANS $\rightarrow$ PTO

Ans:

(i) Celsius to Fahrenheit

$$\text{Formula: } ^\circ\text{F} = \left(^\circ\text{C} \times \frac{9}{5} \right) + 32$$
$$= \left(50 \times \frac{9}{5} \right) + 32$$

$$= 90 + 32$$

$$= 122^\circ\text{F}$$

(ii) Celsius to Kelvin

$$\text{Formula: } \text{K} = ^\circ\text{C} + 273$$

$$= 50 + 273$$

$$= 323 \text{ K}$$

$$\therefore 50^\circ\text{C} = 122^\circ\text{F} = 323 \text{ K}$$

7. Sonia took four identical iron balls of temperature 6°C , 10°C , 20°C and 32°C . She kept them in physical (thermal) contact with one another. After some time, she measures the equilibrium temperature attained by those four balls. What is the value of equilibrium temperature?

Ans: At thermal equilibrium, the final temperature is the average of their initial temperatures:

$$T = \frac{6 + 10 + 20 + 32}{4}$$

$$T = \frac{68}{4} = 17^\circ\text{C}$$

Equilibrium Temperature = 17°C

iii) Long Answer Type:

2. How does the lab thermometer is varies from the clinical thermometer?

Ans:

CLINICAL THERMOMETER	LABORATORY THERMOMETER
i) Used to measure human body temperature	Used to measure temperature of liquids and other substances in laboratories.
ii) Range is usually from 35°C to 42°C	Usually has a wider range, commonly about -10°C to 110°C
iii) It has kink in the capillary tube	It does not have kink
iv) The kink helps to hold the mercury level after removing it from the body.	The liquid column falls immediately when removed from the substance.
v) It can be read after removing it from the body.	It should be kept immersed in the substance while taking the reading.

5. Differentiate between the natural sources and the artificial sources of the heat

Ans → PTO

Ans:

NATURAL SOURCE OF HEAT

i) Heat obtained from natural sources is called natural heat.

ii) They occur naturally in the environment

iii) The Sun is the main natural source of heat for Earth

iv) Example: Sun, Volcanic lava, geothermal heat

v) We cannot control the sun or volcanic heat directly.

ARTIFICIAL SOURCE OF HEAT

Heat produced using human-made devices is called artificial heat.

They are made and controlled by humans

They generally require fuel or electricity to produce heat

Example: Gas stove, electric heater, iron box

We can switch on/off or control many artificial sources.

Answers to be marked in TB

VSA: Q-1, 2, 3, 4, 6, 7, 8, 9, 10, 13, 14, 15, 16

SA: Q-1 :Pg: 3.4 & 3.6

Q-8 :Pg: 3.1 & 3.2

Q-9 :Pg: 3.8

LA: Q-1 : Pg: 3.6

Q-3 : Pg: 3.7

Q-4 : Pg: 3.4 & 3.4