

## UNIT: 1 HEAT AND TEMPERATURE

CLASS : VII

SUBJECT : SCIENCE

### I. Choose the correct answer

1. International unit of measuring temperature is .....  
a. Kelvin      b. Fahrenheit      c. Celsius      d. Joule
2. In thermometer when bulb comes in contact with hot object, liquid inside it  
a. expands      b. contracts      c. remains same      d. none of above
3. The body temperature of a healthy man is;  
a.  $0^{\circ}\text{C}$       b.  $37^{\circ}\text{C}$       c.  $98^{\circ}\text{C}$       d.  $100^{\circ}\text{C}$
4. Mercury is often used in laboratory thermometers because it \_\_\_\_\_  
a. is a harmless liquid      b. is silvery in colour and is attractive in appearance  
c. Expands uniformly      d. is a low cost liquid
5. Which of the following temperature conversions is incorrect  
 $\text{K (Kelvin)} = ^{\circ}\text{C (Celsius)} + 273.15$   $^{\circ}\text{C K}$   
a.  $-273.15$       b.  $-123. +150.15$       c.  $+ 127. + 400.15$       d.  $+ 450 + 733.15$

### II. Fill in the blanks

1. Doctor uses clinical thermometer to measure the human body temperature.
2. At room temperature Mercury is liquid state.
3. Heat energy transfer from hotter object to colder object
4.  $7^{\circ}\text{C}$  temperature is less than  $0^{\circ}\text{C}$  temperature.
5. The common laboratory thermometer is a mercury thermometer.

### III. Match the following

- |                                      |   |                       |
|--------------------------------------|---|-----------------------|
| i) Clinical thermometer              | - | Kink                  |
| ii) Normal temperature of human body | - | $37^{\circ}\text{C}$  |
| iii) Heat                            | - | A form of energy      |
| iv) Boiling point of water           | - | $100^{\circ}\text{C}$ |
| v) Melting point of water            | - | $0^{\circ}\text{C}$   |

### IV. Give very short answer

1. Temperature of Srinagar (J&K) is  $4^{\circ}\text{C}$  and in Kodaikanal is  $3^{\circ}\text{C}$  which of them has greater temperature? What is the difference between the temperatures of these two places?

Kodaikanal has greater temperature.

Temperature of srinagar (J &K) =  $-4^{\circ}\text{C}$

Temperature of =  $3^{\circ}\text{C}$

$$\text{Difference} = -4^{\circ}\text{C} + 3^{\circ}\text{C} = 7^{\circ}\text{C}$$

Srinagar is colder than that of kodaikanal.

**2. Jyothi was prepared to measure the temperature of hot water with a clinical thermometer. Is it right or wrong? Why?**

It is wrong, because clinical thermometer has small temperature range ( $35^{\circ}\text{C}$  to  $42^{\circ}\text{C}$  or  $94^{\circ}\text{F}$  to  $108^{\circ}\text{F}$ ). If it is used to measure the temperature of hot water, the glass will crack/ burst due to excessive pressure created by expansion of mercury.

**3. A clinical thermometer is not used to measure the temperature of air, why?**

The range of the clinical thermometer is less than that of thermometer used to measure temperature of air.

**4. What is the use of kink in clinical thermometer?**

A kink in clinical thermometer prevents the mercury from flowing back into the bulb when the thermometer is taken out of the patient's mouth, so that the temperature can be noted conveniently.

**5. Why do we jerk a clinical thermometer before we measure the body temperature?**

jerk the thermometer a few times to bring the level of the mercury down. Before use, the mercury level should be below  $35^{\circ}\text{C}$  or  $94^{\circ}\text{F}$ .

**V. Give short Answer**

**1. Why do we use Mercury in thermometers? Can water be used instead of mercury? What are the problems in using it?**

- ❖ We use mercury in thermometers as they remain in liquid form even with a change of temperature in it.
- ❖ A small change in the temperature causes change in volume of a liquid.
- ❖ Water cannot be used as a thermometric liquid, because it is not helpful to measure below  $0^{\circ}\text{C}$  and above  $100^{\circ}\text{C}$ .
- ❖ Water is transparent. So it makes the reading of the scales of the thermometer more difficult, water wets the glass tube so its steady is glass tube.
- ❖ Due to this constraints it is not used as a thermometric liquid.

**2. Swathi kept a laboratory thermometer in hot water for some time and took it out to read the temperature. Ramani said it was a wrong way of measuring temperature. Do you agree with Ramani? Explain your answer.**

Yes, I agree with Ramani.

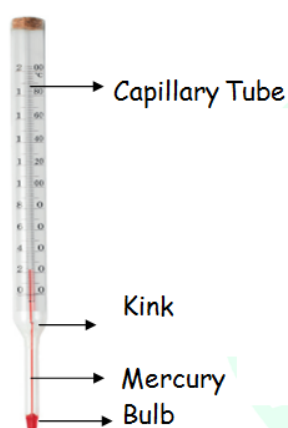
1. Laboratory thermometer does not have a kink. So, when Swathi takes out the thermometer, the level can go back because of absence of kink.
2. So Swathi should note the reading when the thermometer bulb has surrounded by hot water.

3. The body temperature of Srinath is  $99^{\circ}\text{F}$ . Is he suffering from fever? If so, why?

Srinath is having a fever because the normal body temperature is  $98.6^{\circ}\text{F}$ .

## VI. Give long answer

1. Draw the diagram of a clinical thermometer and label its parts.



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

**Similarities** between laboratory thermometer and the clinical thermometer.

Both clinical and laboratory thermometers have long, narrow and uniform glass tubes. Bulbs contain mercury. Both have Celsius scale.

### Differences:

Clinical Thermometer	Laboratory Thermometer
Clinical thermometer is scaled from $35^{\circ}\text{C}$ to $42^{\circ}\text{C}$ or from $94^{\circ}\text{F}$ to $108^{\circ}\text{F}$ .	Laboratory thermometer is generally scaled from $-10^{\circ}\text{C}$ to $110^{\circ}\text{C}$ .
Mercury level does not fall on its own, as there is a kink near the bulb to prevent the fall of mercury level.	Mercury level falls on its own as no kink is present.
Temperature can be read after removing the thermometer from armpit or mouth.	Temperature is read while keeping the thermometer in the source of temperature, e.g. a liquid or any other thing.
To lower the mercury level jerks are given.	No need to give jerk to lower the mercury level.
It is used for taking the body temperature.	It is used to take temperature in laboratory.

## VII. Higher Order Thinking questions

1. What must be the temperature in Fahrenheit, so that it will be twice its value in Celsius?

According to the question,  $F = 2C$  and  $C_1 = C$

$$F = 9C / 5 + 32$$

$$2c = 9 / 5 + 32$$

$$2C - 9 / 5 C = 32 \Rightarrow 10C - 9C / 5 = 32 + 0$$

$$1C / 5 = 32$$

$$1C = 32 \times 5$$

$$C = 160^{\circ}$$

$$F = 2C \times 2 \times 160^{\circ}$$

$$F = 320^{\circ}$$

3. Go to a veterinary doctor (a doctor who treats animals). Discuss and find out the normal temperature of domestic animals and birds.

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❖ Dog	-	38.9°C
❖ Horse	-	38°C
❖ Rabbit	-	38.3°C
❖ Cow	-	38.6°C
❖ Cat	-	39°C
❖ Goat	-	39.7°C
❖ Pigeon	-	44.1°C
❖ Crow	-	40°C
❖ Duck	-	40.7°C
❖ Karaknath	-	41.8°C
❖ Parrot	-	41°C

