BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI – 110034

SUBJECT:-PHYSICS

CHAPTER:- Heat

GUIDELINES:

Dear Students

- There is only **1 Assignment** :

  Assignment: Based on types of thermometer

- Complete the Assignment in the Science Notebook.
- **A video link** has been provided for better understanding of the concept through visuals. Watch the video carefully as this will help you in doing the assignment.
- Read the lesson from **NCERT textbook** also.
- Link for lesson :- http://ncert.nic.in/textbook/textbook.htm?gesc1=4-19

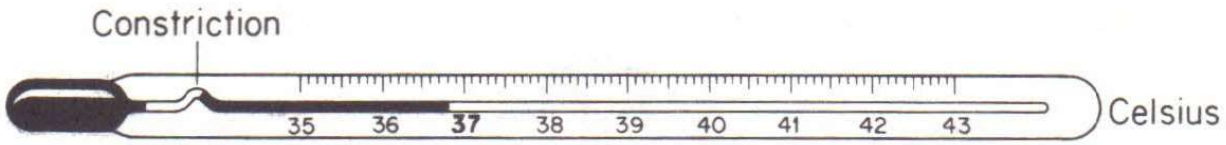
SUB TOPICS:

Types of thermometer

1. Clinical thermometer

2. Laboratory thermometer

Clinical Thermometer



- It is a device that is used to measure the body temperature of a person.
- It is made up of a glass tube of uniform thickness.
- The glass tube contains a bulb at one end which is filled with Mercury.
- The Mercury level in the thermometer rises up in the thread-like portion of the thermometer which therefore indicates the temperature of the body.
- The level of the Mercury can be measured by reading the scale given on the thermometer.
- The scale of the thermometer records the temperature in degree Celsius, generally, 35° C to 45° C, which is the range of human body temperature.
- On an average, the temperature of the human body is around 37° C.
- The clinical thermometer has a small sharp curve (kink) present near the bulb. This prevents the Mercury level from falling down on its own in the thermometer.

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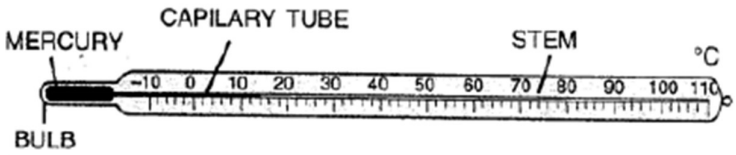
Laboratory Thermometer



- The laboratory thermometer is used to find out the temperature of the other objects such as water rather than human body temperature.
- It can measure the temperature from -10° C to 110° C.

What precautions should be taken when using a laboratory thermometer?

Measuring temperature of water with a laboratory thermometer

- You should always follow the same precautions as that of the clinical thermometer.
- You should always hold the laboratory thermometer in a straight upright position without titling it.
- The bulb of the thermometer should never touch the surface of the container in which the substance is kept.
- However, the bulb of the thermometer should be completely immersed in the substance so that it covers the bulb from all the sides.

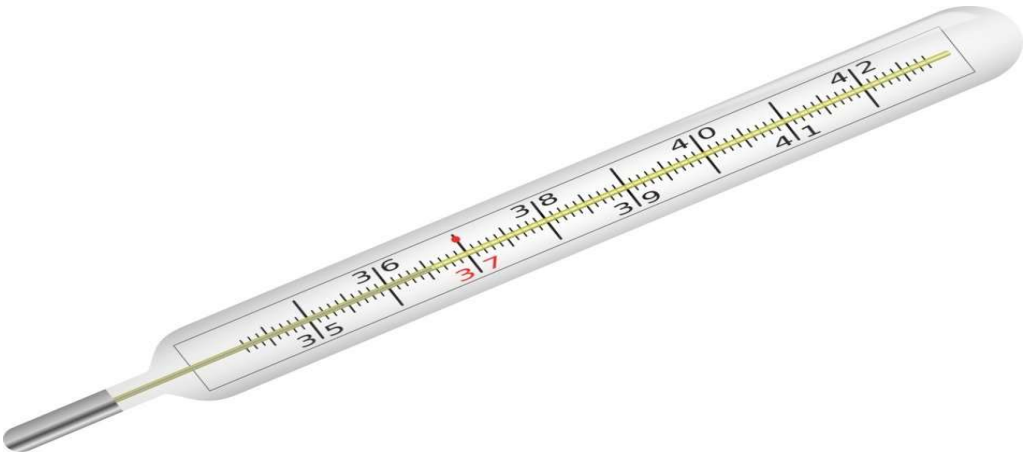
Activity-Measuring temperature of water with a laboratory thermometer

Take some hot water in a beaker or a mug. Dip the thermometer in water. Wait till the mercury thread becomes steady and note the temperature. Now take the thermometer out from water. Observe carefully what happens now. Do you notice that as soon as you takethe thermometer out of water, the level of mercury begins to fall? This means that the temperature must be read whilethe thermometer is in water. You may recall that while taking your own temperature, you have to take the thermometer out of your mouth to note the reading. Can you then use thelaboratory thermometer to measure your body temperature?

Why it is not convenient to use the laboratory thermometer for measuring the body temperature?

Laboratory thermometer can show body's temperature while the thermometer is in patient's mouth only. Whereas the mercury does not fall or rise in a clinical thermometer when taken out of the mouth as there is a kink near the bulb. It prevents mercury level from falling on its own.

Activity -Reading a thermometer



Let us learn how to read a thermometer.

- First, note the temperature difference indicated between the two bigger marks. In the above figure let us consider the two consecutive bigger marks 36^0Celsius and 37^0Celsius.
- Also note down the number of divisions (shown by smaller marks) between these marks which is 10 in the above figure.
- So one small division=37-36/10= 1/10=0.1^0C

Then, one small division can read 1/10 = 0.1 ^oC. This is also called the least count of the thermometer.

Other types of thermometers

Minimum-maximum thermometer: It is a thermometer used to measure the minimum and maximum temperature of the day by weather forecasters.

Digital thermometer: It is sometimes difficult to handle a Mercury filled thermometer especially when it breaks and the mercury falls out. However, nowadays digital thermometers are available to use. This type of thermometer does not contain Mercury. It directly displays the correct temperature on a display screen.

Difference between clinical and laboratory thermometer:

Clinical Thermometer	Laboratory Thermometer
Clinical thermometer is scaled from 35°C to 42°C or from 94°F to 108°F.	Laboratory thermometer is generally scaled from -10°C to 110°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.

Watch the following video for better understanding -

https://www.youtube.com/watch?v=wWHlN0ABuuU

ASSIGNMENT

Q1. Fill in the blanks

a. The range of a clinical thermometer in the Celsius scale is_____& in the Fahrenheit is_____

b. The range of laboratory thermometer is_____.

c. _____thermometer does not use mercury.

d.The maximum and minimum temperatures of the previous day, reported in weather reports, are measured by thermometer called the_____thermometer.

e.The _____ in a clinical thermometer prevents backflow of the Mercury into the bulb.

Q2. X and Y measured their body temperature,.X found it to be 98.6 °F and Y recorded 37 °C. Which of the following statement is true?

(a) X has a higher body temperature than Y

(b) X has a lower body temperature than Y.

(c) Both have normal body temperature.

(d) Both are suffering from fever.

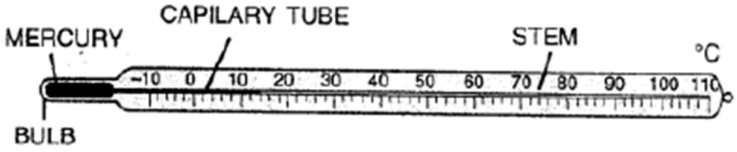
Q3 Draw a well labelled diagram of a laboratory thermometer.

Q4 Give reasons

a. A clinical thermometer cannot be used to measure the temperature of boiling water.
b. It is not convenient to use a laboratory thermometer to measure body temperature.

Q5 Differentiate between clinical and laboratory thermometer.

Q6



Find the least count of the above thermometer.

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