

## 12.2 THERMOMETRIC SCALES

1. Various degree of hotness is represented by a temperature scale.
2. In order to establish a thermometric scale, we need:
  - i) a thermometric property i.e. a physical property that varies consistently with degree of hotness.
  - ii) Two fixed point i.e. two degree of hotness which is easily and accurately reproducible.
3. Example of thermometric properties are:
  - a) volume of a liquid or length of a liquid column.
  - b) pressure of a fixed mass of gas at constant volume.
  - c) resistance of a coil of wire.
  - d) e.m.f. of a thermocouple.
4. There are many fixed points in nature. The two points most often used are:
  - i) the ice-point, which is the temperature of pure melting ice, assigned a value of  $0^{\circ}\text{C}$ .
  - ii) the steam point which is the temperature of the steam from pure water boiling under standard pressure, assigned a value of  $100^{\circ}\text{C}$ .
5. In order to establish a temperature scale:
  - i) measure  $x_0$ , the chosen thermometric property at the ice-point.
  - ii) measure  $x_{100}$ , the chosen thermometric property at the steam point.
  - iii) measure  $x_{\theta}$ , the thermometric property at the unknown temperature  $\theta/^{\circ}\text{C}$ .
  - iv) calculate  $\theta$  from the equation

$$\theta/^{\circ}\text{C} = \left( \frac{x_{\theta} - x_0}{x_{100} - x_0} \right) 100$$

6. These equation and its rationale can be illustrated graphically :