1. Two bodies made of the same material have the same external dimensions and appearance, but one is solid and the other is hollow. When they are hated, is the overall volume expansion the same or different?
2. Define linear, superficial and cubical expansivities. Show that $\beta = 2\alpha$ where $\alpha$ and $\beta$ are linear and superficial expansivities.
3. Describe the method to determine the linear expansivity of a solid can the cubical expansivity be derived from this value?
4. Does cubical expansivity depend upon the initial volume of a solid? Write the unit of this expansivity. Also derive its relation with superficial expansivity.
5. Define linear and cubical expansivities. Derive a relation between them.
6. Obtain an expression for the change in density of a gas due to the thermal expansion.
7. Define the coefficient of real and opparant expansions of a liquid and derive a relation between them.
8. Describe with mathematical detail, a method to determine real expansivity of a liquid.
9. Aquatic animal stays alive in frozen ponds in winter. Explain.
10. What is Bimetallic thermostat? Explain its working principle.
11. A clock which has a brass pendulum beats seconds correctly when the temperature of the room is 45°C. How many seconds will it gain or loss per day when temperature of room falls to 15°C. [$\alpha$ for brass = $0.000019°C^{-1}$]
12. A brass rod is 185cm long and 1.6cm in diameter. What force must be applied to each end of the rod to prevent it from contracting when it is cooled from 12°C to 10°C?
    [$\alpha = 2 \times 10^{-5}$ °C and $y = 0.9 \times 10^{11}$ N/m$^2$]
13. A glass flask of volume 400 cm$^3$ is just filled with mercury at 10°C. How much mercury overflows when the temperature of system is raise to 90°C. [$\alpha g = 0.4 \times 10^{-5}$ K$^{-1}$ and $\gamma_{Hg} = 18 \times 10^{-5}$ K$^{-1}$]
14. A centigrade thermometer reads 2°C at the melting. Point of ice and 99°C at the boiling point of water at normal pressure. What is the correct temperature when it reads 30°C?
15. The length of rod is measured by brass scale when both of them are 10°C, the measured length is 50cm. What is the length of the rod at 40°C when measured by brass scale 40°C? [$\alpha$ for brass = $24 \times 10^{-6} °C^{-1}$, $\alpha$ for iron = $16 \times 10^{-6}$ °C$^{-1}$]

*End *