

*A pendulum clock having copper rod keeps correct time at 20°C. It gains 15 seconds per day if cooled to 0°C. Calculate the coefficient of linear expansion of copper.*

Time gain/lost by a pendulum clock per day =  $\frac{1}{2} \alpha \Delta T \times 86400 \text{ sec.}$

$$\Rightarrow 15 = \frac{1}{2} \alpha (20 - 0) \times 86400$$

$$\Rightarrow \alpha = \frac{15}{86400 \times 10}$$

$$\Rightarrow \alpha = 1.7 \times 10^{-5} \text{ } ^\circ\text{C}^{-1}$$