1/12/2020
TUESDAY

PHYSICS

STD- XI
class-05

Assignment

1) In the relation $p = \frac{\alpha}{\beta} \times e^{\frac{-\alpha z}{k\theta}}$, the dimensional formula of β is _____.

a) $[M^0 L^2 T^0]$ b) $[ML^2T]$

c) $[ML^0T^{-1}]$ c) $[M^0L^2T^{-1}]$

Ans) Answer is $[M^0L^2T^0]$,

In the relation, $p = \frac{\alpha}{\beta} \times e^{\frac{-\alpha z}{k\theta}}$,

P = pressure . z = distance

k = Boltzman constant θ = temperature

The dimensional formula of β will be :

$$p = \frac{\alpha}{\beta} \times e^{\frac{-\alpha z}{k\theta}}$$

$$\frac{\alpha z}{k\theta} = [M^0L^0T^0]$$

$$\therefore \alpha = \frac{k\theta}{z}$$

$$k = [M^1L^2T^{-2}K^{-1}]$$

$$\alpha = \frac{[M^1L^2T^{-2}K^{-1}][K^1]}{[L^1]}$$

$$p = \frac{\alpha}{\beta}$$

$$\therefore \beta = \frac{\alpha}{p}$$

$$\therefore \beta = \frac{[M^1L^1T^{-2}K^0]}{[M^1L^{-1}T^{-2}]}$$

$$\beta = [M^0L^2T^0]$$