CBSE TEST PAPER-01

CLASS - XI PHYSICS (Physical World & Measurement)
Topic: - Physical World & Measurement [ANSWERS]

Ans1: $a = \frac{x}{t} = m/s$

$b = \frac{x}{t} = m/s^2$

Ans2: (i) $3.0 m/s^2 = \frac{3\times10^{-3}}{\left(\frac{1}{3600}h\right)^2}$ km/hr^2 = 3.9×10^4 km/hr^2

(ii) $6.67\ 10^{-11} Nm^2/kg^2 = g^{-1}cm^3s^{-2}$

$= 6.67\times10^{-11} kg^{-1}m^3s^{-2}$

$= 6.67\times10^{-11}\times10^3\times(10^2 cm)^3$

$= 6.67\times10^{-8} g^{-1}cm^3s^{-2}$

Ans3: S.I unit of luminous intensity is candela (cd) and of temperature is Kelvin (k).

Ans4: $\text{time} = \frac{\text{distance}}{\text{velocity}}$

$\text{time} = \frac{1.56\times10^{-16}}{3\times10^8}$

$t = 5.2\times10^{-25}$ seconds

Ans5: $F = MLT^{-2}$; $A = LT^{-2}$ ---------(1)

F=MA $\Rightarrow$ M=FA^{-1} $\rightarrow$ (2)

From equation 1) L = AT^2

$\therefore$ Dimensions of energy = ML^2 T^{-2}

$\left[FA^{-1}\ A^2\ T^4\ T^{-2}\right]$

$= \left[FAT^2\right]$

Ans6: Here $R_1 = 100 \pm 3\Omega$

$R_2 = 200 \pm 4\Omega$

In series $R_{net} = R_1 + R_2$

$R_{net} = (100 \pm 3\Omega) + (200 \pm 4\Omega)$

$R_{net} = (300 \pm 7)\, ohms.$

Ans7: force = mass × acceleration

$$\text{force} = \text{mass} \times \frac{\text{velocity}}{\text{time}}$$

$$\frac{\text{time} \times \text{force}}{\text{velocity}} = \text{mass}$$

$$mass = \frac{FT}{V}$$

$$mass = \left[FTV^{-1} \right]$$

Ans8: $y = \dfrac{[F]}{[L^2]} = \dfrac{MLT^{-2}}{[L^2]} = \left[ML^{-1}T^{-2} \right]$

Comparing with $M^a L^b T^c$

$a = 1, \quad b = -1, \quad c = -2$

$$n_2 = n_1 \left[\frac{M^1}{M_2} \right]^a \left[\frac{L^1}{L_2} \right]^b \left[\frac{T^1}{T_2} \right]^c$$

$$n_2 = 19 \times 10^{10} \left[\frac{1kg}{1g} \right]^1 \left[\frac{1m}{1cm} \right]^{-1} \left[\frac{1S}{1S} \right]^{-2}$$

$$n_2 = 19 \times 10^{10} \left[\frac{1000g}{1g} \right] \left[\frac{100cm}{1cm} \right]^{-1} [1]^{-2}$$

$$n_2 = 19 \times 10^{10} \left[1000 \times \frac{1}{100} \times 1 \right]$$

$$\boxed{n_2 = 19 \times 10^{11}}$$

Ans9: $\upsilon \alpha \lambda^a p^b g^c$

$\upsilon = R\lambda^a p^b g^c$ ----------(1)

Where K is dimensionless constant

$$\left[LT^{-1} \right] = [L]^a \left[ML^{-3} \right]^b \left[LT^{-2} \right]^c$$

$$\left[M^o LT^{-1} \right] = [L]^{a-3b+c} [M]^b [T]^{-2c}$$

$a - 3b + c = 1$

$b = 0 \quad \Rightarrow a = 1/2$

$-2c = -1$

$c = 1/2$ Put these values in equation (1)

$v = k\lambda^{1/2} P^{o} g^{1/2}$

$v = k\lambda^{1/2} g^{1/2}$

$$\boxed{v = k\sqrt{\lambda g}}$$

Ans10: (i) $F = \dfrac{mv^2}{r}$

$$\frac{\Delta F}{F} = \frac{\Delta m}{m} + 2\frac{\Delta v}{v} + \frac{\Delta r}{r}$$

$$\frac{\Delta F}{F} = \frac{0.1}{3.5} + 2 \times \frac{1}{20} + \frac{0.5}{12.5}$$

$$\frac{\Delta F}{F} = 0.17$$

(ii) % error in F = $0.17 \times 100 = 17\%$

(iii) $F = \dfrac{mv^2}{r} = \dfrac{(3.5) \times (20)^2}{12.5}$

$$\boxed{F = 112N}$$

$$\boxed{\Delta F = 19N}$$

$\Delta F = 0.17 \times 112$

Measurement of force $\boxed{F = 112 \pm 19N}$