CBSE TEST PAPER-02

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

Ans1: A^o and A.U. both are the units of distances but $1A^o = 10^{-10}$m and 1A.U. = 1.496×10^{11}m.

Ans2: One steradian is defined as the angle made by a spherical plane of area 1 square meter at the centre of a sphere of radius 1m.

Ans3: Energy and pressure.

Ans4: $r = 824.7\times10^6 km$

$\theta = 35.72^4$

$\theta = \frac{35.72}{60\times60}\times\frac{\pi}{180}$ radian

Diameter $l = ?$

$l = r\theta$

$l = 824.7\times10^6\times\frac{35.72}{60\times60}\times\frac{\pi}{180}$

$\boxed{l = 1.429\times10^5 km}$

Ans5: $x = c\times t/2$

$\Rightarrow c = 2x/t = \frac{2\times6.3\times10^{10}}{7\times60} = 3\times10^8 m/s$

Ans6: (1) Radioactive dating – to know age of fossil fuels, rocks etc.

(2) Atomic clocks – used to note periodic vibrations taking place within two atoms.

Ans7: (1) Latent Heat $= \dfrac{Q(Heat\ Energy)}{m(mass)}$

$$\text{Latent Heat} = \frac{ML^2T^{-2}}{M} = \left[M^oL^2T^{-2}\right]$$

(2) Specific heat = $(S) = \dfrac{Q}{m \times Q}\dfrac{ML^2T^{-2}}{M \times K}$

$$(S) = \left[M^oL^2T^{-2}K^{-1}\right]$$

Ans8: $P = a/V^2 \Rightarrow a = PV^2$

$$a = \frac{F}{A} \times V^2$$
$$a = \frac{MLT^{-2}}{L^2} \times \left[L^3\right]^2$$
$$a = \frac{MLT^{-2}L^6}{L^2}$$
$$a = \left[ML^5T^{-2}\right]$$

$Also\ \ b = V$

$V = \left[M^oL^3T^o\right]$

Ans9: $E = \left[ML^2T^{-2}\right]$

$L = \left[ML^2T^{-1}\right]$

$m = \left[M\right]$

$G = \left[M^{-1}L^3T^{-2}\right]$

$\therefore$ Dimensions of $EL^2/m^5G^2 = \dfrac{\left[ML^2T^{-2}\right]\left[ML^2T^{-1}\right]^2}{\left[M\right]^5\left[M^{-1}L^3T^{-2}\right]^2}$

$= \dfrac{M^3L^6T^{-4}}{M^3L^6T^{-4}} = 1$

Thus, it is dimension less

Ans10: (a) (i) Pressure $= F/A = \frac{MLT^{-2}}{L^2} = \left[ML^{-1}T^{-2}\right]$

$$\left[ML^{-1}T^{-2}\right] = \frac{ML^2T^{-2}}{L^3}$$

$$\left[ML^{-1}T^{-2}\right] = \left[ML^{-1}T^{-2}\right]$$

Hence it is dimensionally correct

(ii) Pressure = Momentum $\times$ volume $\times$ time

$$\left[ML^{-1}T^{-2}\right] = [M]\left[LT^{-1}\right] \times \left[L^3\right] \times [T]$$

$$\left[ML^{-1}T^{-2}\right] = \left[ML^4T^o\right]$$

Hence, it is not correct

(b) $\rho = \frac{4m}{\pi D^2 l}$

$$\frac{\Delta\rho}{P} = \frac{\Delta m}{m} + 2\frac{\Delta D}{D} + \frac{\Delta l}{l}$$

$$\frac{\Delta P}{P}\% = 1\% + 2\times(1.5)\% + 0.5\%$$

$\% \frac{\Delta l}{l} = 4.5\%$ $\times \Rightarrow \frac{\Delta P}{P}\% = 4.5\%$