PA – 2

Ans-Key (P.A – 2) XI Physics

Q1 Yes, in case of ring – (1)

Q2 As $L = I\omega$ as I dec ω inc – (1)

Q3 (i) No (ii) Yes — $\frac{1}{2}+\frac{1}{2}$

Q4 No, ~~As~~ show that $KE \propto \frac{1}{I}$ · $\frac{1}{2}$ + $1\frac{1}{2}$

Q5 Art. – (2)

Q6 $V_2 = \frac{1}{64}V_1 \Rightarrow R_2 = \frac{1}{4}R_1$ As $I_1\omega_1 = I_2\omega_2$

$\frac{2}{5}mR_2^2 \times \frac{1}{T_2} = \frac{2}{5}mR_1^2 \times \frac{1}{T_1}$

$\Rightarrow T_2 = \frac{R_2^2}{R_1^2} \times T_1 \Rightarrow T_2 = \left(\frac{1}{4}\right)^2 \times 24 = 1.5\ hr$ (3)

Q7 ~~Art. or Art~~ (3)

Q8 $\omega = \frac{I_1\omega_1 + I_2\omega_2}{I_1 + I_2}$ and Loss in $KE = \frac{-I_1I_2(\omega_1-\omega_2)^2}{2(I_1+I_2)}$ (3)

Q9 Let σ is mass per unit area

$X = \frac{m_1x_1 + m_2x_2 + m_3x_3 + m_4x_4}{m_1+m_2+m_3+m_4}$ $Y = \frac{m_1y_1 + m_2y_2 + m_3y_3 + m_4y_4}{m_1+m_2+m_3+m_4}$

$m_1 = 12\sigma$ $x_1 = 3$ $y_1 = 1$

$m_2 = 4\sigma$ $x_2 = 3$ $y_2 = 5$

$m_3 = 12\sigma$ $x_3 = 3$ $y_3 = 9$

$m_4 = 12\sigma$ $x_4 = 1$ $y_4 = 5$

~~put y value and get so Rk~~

Q10 ~~Art~~ Definition – $\frac{1}{2}$ formula – $\frac{1}{2}$

$\frac{1}{2}mv_0^2 = \frac{3}{2}mv^2 - \frac{1}{2}mv_e^2 \Rightarrow v_0^2 = \sqrt{9v_e^2 - v_e^2}$ – 2

$= \sqrt{8}\,v_e = 31.68\ km/sec$

Q11 (i) Art (ii) Show $h = R/2$ $2+1=3$

Q12 (i) Art (ii) As $m_1 = m_2$ $V_1\rho_1 = V_2\rho_2 \Rightarrow \frac{\rho_1}{\rho_2} = \frac{r_2^2}{r_1^2}$

Now $\frac{I_1}{I_2} = \frac{\frac{1}{2}m_1r_1^2}{\frac{1}{2}m_2r_2^2} = \frac{r_1^2}{r_2^2} \Rightarrow \frac{I_1}{I_2} = \frac{\rho_2}{\rho_1}$ So $I \propto \frac{1}{\rho}$

So MI of less density is more and vice versa

Or

(i) Art (ii) As per Q. when $b \to 0$ $\rho = a$ constant ~~s~~ CM is at centre ~~of rod i.e. 0.5m~~

Q13 (i) Art (ii) change in GPE = GPE at nR – GPE at earth

$\Rightarrow = -\frac{GMm}{(R+nR)} - \frac{GMm}{R} \Rightarrow$ change $= \left(\frac{n}{n+1}\right)mgR$

Or

(i) Art (ii) $F = \frac{Gm(M-m)}{r^2}$ $\frac{dF}{dm} = 0 \Rightarrow m = M/2$

So $m_1 = M/2$ $m_2 = M/2$