

۲۱۰ | آسان

نقطه A

۲۱۱ | متوسط

$$K = \frac{1}{r} (m_1 + m_2) v^r \Rightarrow r_2 \omega = \frac{1}{r} (\omega) v^r$$

$$v^r = 9 \Rightarrow v = 3 \text{ m/s}$$

$$v^r - v_0^r = r a \Delta x \Rightarrow 9 = 2 a \times 9$$

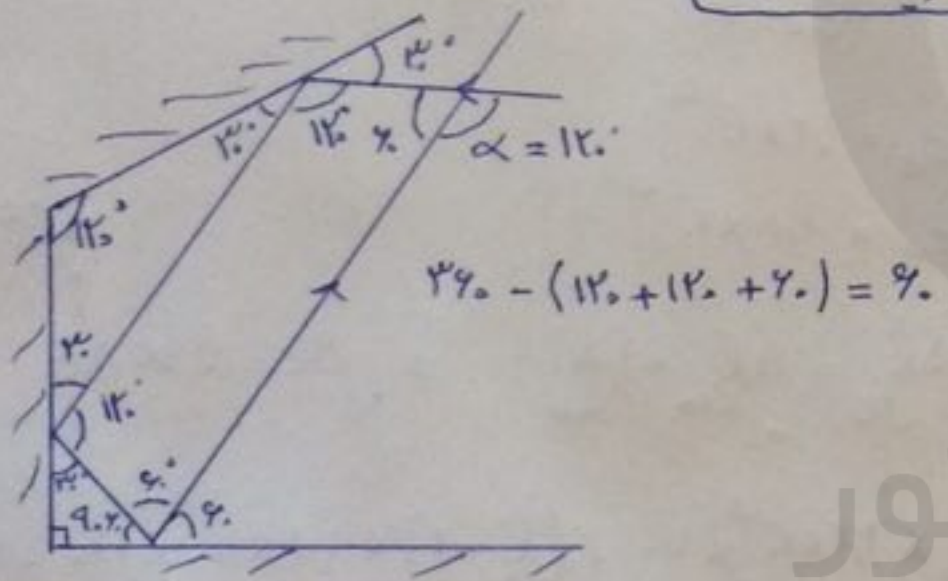
$$a = \omega \text{ m/s}^2$$

$$\sum F = m \cdot a \Rightarrow m_p g = (m_1 + m_2 + m_p) a$$

$$10 m_p = (\omega + m_p) \times \omega$$

$$\omega m_p = 2 \omega \rightarrow m_p = 2 \text{ kg}$$

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$$36^\circ - (12^\circ + 12^\circ + 2^\circ) = 9^\circ$$

۲۱۳ | متوسط

$$F = 10$$

$$P = 22 \quad \frac{1}{p} + \frac{1}{q} = \frac{1}{f}$$

$$\frac{1}{22} + \frac{1}{q} = \frac{1}{10} \Rightarrow \frac{1}{q} = \frac{9}{110}$$

$$q = 12.2 \text{ cm}$$

$$q' = 100 \text{ cm} \quad \frac{1}{p'} + \frac{1}{100} = \frac{1}{10}$$

$$\frac{1}{p'} = \frac{9}{100} \Rightarrow p' = \frac{100}{9} = 11.1 \text{ cm}$$

کمی سانی متر در کسب

۲۱۴ | متوسط

$$\Delta = 44 \text{ cm}$$

$$D = \frac{1}{p} = + \frac{100}{11} \Rightarrow p = \frac{1100}{11} = 100 \text{ cm}$$

باسم شری فیروز رسته تجری - کنگره ۹۵ - دفتر ۳
باسم از ملل ابراهیمان - ۹۱۲۳۷۱۳۰۴۳ - اصفهان

۲۵۶ | آسان گزینہ ۳

$$\bar{a} = \frac{\Delta \vec{v}}{\Delta t} = \frac{19\hat{i} - 20\hat{j}}{4} = 4.75\hat{i} - 5\hat{j}$$

۲۵۷ | گزینہ ۳ سخت

$$x_0 = 0, v_0 = -10$$

$$x = \frac{1}{2} a t^2 + v_0 t + x_0$$

$$x = \frac{1}{2} \times 2 \times (10)^2 + (-10)(10) + 0 = 0$$

$$v_t = a t + v_0 = 2 \times 10 - 10 = 10 \text{ m/s}$$

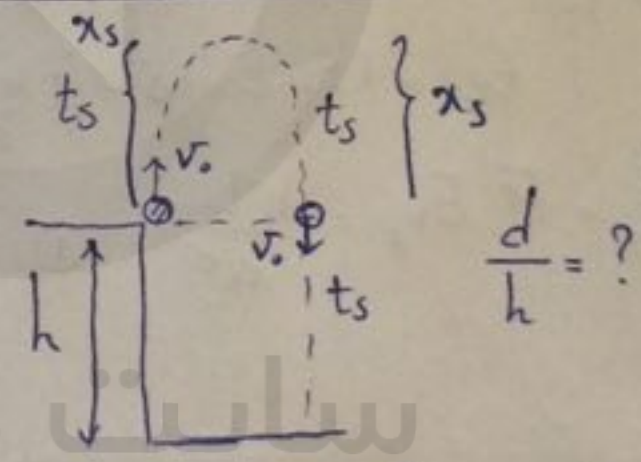
$$x' = \frac{1}{2} \times 2 \times (\omega)^2 + 10 \times \omega = 100$$

$$v_{10} = 2 \times 5 + 10 = 20, \quad \frac{dv}{dt} = -2t + 20$$

$$x'' = \frac{1}{2} \times (-2)(5)^2 + 20 \times 5 + 100 = 175$$

$$x''' = -2 \times 5 + 20 + 100 = 110$$

۲۵۸ | گزینہ ۲ سخت



اما با شل $v_0 = 20 \text{ m/s}$ است
نیت کار

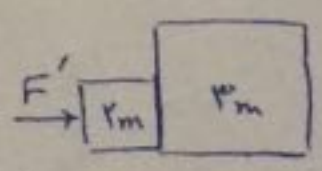
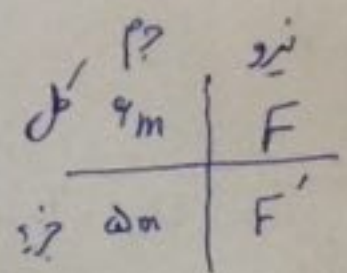
$$t_s = \frac{v_0}{g}, \quad x_s = \frac{v_0^2}{2g} = \omega t_s^2, \quad \frac{v_0^2}{g} = 10 t_s^2$$

$$h = \frac{1}{2} g t_s^2 + v_0 t_s = \omega t_s^2 + v_0 t_s = 15 \omega t_s^2$$

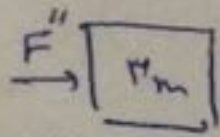
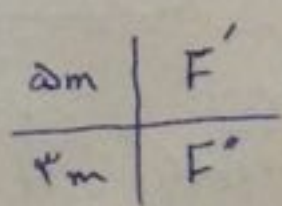
$$d = x_s + x_s + h = \omega t_s^2 + \omega t_s^2 + 15 \omega t_s^2 = 17 \omega t_s^2$$

$$\frac{d}{h} = \frac{17 \omega t_s^2}{15 \omega t_s^2} = \frac{17}{15} = \frac{d}{h}$$

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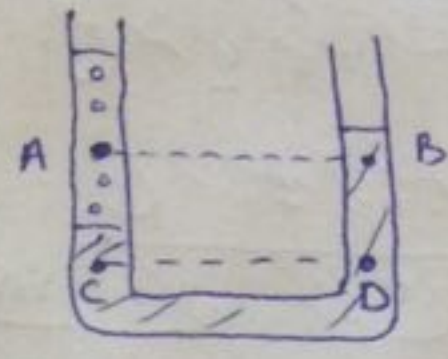


$$\frac{F'}{F} = \frac{2m}{9m} = \frac{2}{9} \rightarrow F' < F$$



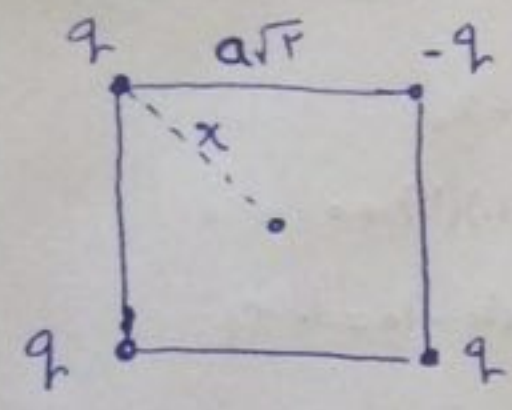
$$\frac{F''}{F'} = \frac{3m}{5m} = \frac{3}{5} \rightarrow F'' < F'$$

۲۱۸ از درجۀ نرینه صنیی استونہ



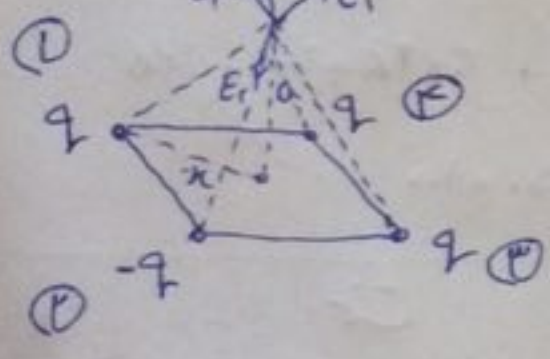
$P_C = P_D$
 و چون $P_B \neq P_A$
 نرینه در دست است

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$x = a\sqrt{2} \frac{\sqrt{2}}{2} = a$
 $r = \sqrt{x^2 + a^2} = \sqrt{2}a$

$E = k \frac{q}{r^2} = k \frac{q}{2a^2} = E_1 = E_2 = E_3 = E_4$



$E_{1,2} = 2E_1 \cos 45^\circ$
 $= 2k \frac{q}{2a^2} \times \frac{\sqrt{2}}{2} = \frac{\sqrt{2}kq}{2a^2}$
 $E_{3,4} = 2E_2 \cos 45^\circ = \frac{\sqrt{2}kq}{2a^2}$

$\theta = 90^\circ \Rightarrow E_T = \sqrt{2} E_{1,2} = \frac{kq}{a^2}$

۲۲۰ نرینه ۳ متوسط

$U_p = 30 \times 10^{-3} = 6 \times 10^{-3} (J)$

$\frac{1}{C_T} = \frac{1}{C_1} + \frac{1}{\frac{3}{2}C_1} + \frac{1}{\frac{1}{2}C_1} = \frac{1}{C_1} \left(\frac{1}{1} + \frac{2}{3} + \frac{1}{2} \right)$

$\frac{1}{C_T} = \frac{3+2+1}{3} \times \frac{1}{C_1} \rightarrow C_T = \frac{C_1}{3}$

$\frac{U_T}{U_p} = \frac{C_p}{C_T} \Rightarrow \frac{U_T}{30} = \frac{\frac{3}{2}C_1}{\frac{1}{2}C_1} \Rightarrow U_T = 90 \text{ mJ}$

۲۲۱ نرینه ۳ متوسط

$E_T = 2E_r$
 $I = \frac{2E_r}{r_1 - r_1 + r_2 + r_1} = \frac{E_r}{r_2} = \frac{E_1}{r_1}$

$V_{AB} = E_r - I r_2 = E_r - \frac{E_r}{r_2} \times r_2 = 0$

$V_{AB} = E_1 - I r_1 = E_1 - \frac{E_1}{r_1} \times r_1 \neq 0$

۲۱۴ اداری

$P = ?$
 $m = ?$
 $F = \frac{mP}{m+1} \Rightarrow \parallel = \frac{P}{r} \Rightarrow P = 22$

$F = \frac{m \Delta}{(m+1)^2} \Rightarrow \parallel = \frac{m \times r^2}{(m+1)^2} \Rightarrow (m+1)^2 = 2^2 m$
 $\Rightarrow m = 1$

۲۱۵ نرینه ۱ سوال

$\frac{P_r}{V_r} = \frac{P_i}{V_i} = - \frac{\Delta P}{\Delta V}$

$\frac{P_i}{\frac{1}{100} V_i} = - \frac{15 \times 10^5}{-\frac{1}{100} V_i} \rightarrow P_i = 1.5 \text{ Pa}$

۲۱۶ نرینه ۳ متوسط

$\begin{cases} \Delta l_{Fe} = \Delta l_{Cu} + 1 & \theta = 0^\circ \\ \Delta l'_{Fe} = \Delta l_{Cu} - 1.5 & \theta = 100^\circ \end{cases}$
 $\alpha_{Fe} = 1.2 \times 10^{-5}$
 $\alpha_{Cu} = 1.8 \times 10^{-5}$

$\Delta l_{Fe} = \Delta l_{Cu} - 1.5 \text{ mm}, \Delta l = l \alpha \Delta \theta$

$l_{Fe} \times 1.2 \times 10^{-5} \times 100 = (l_{Fe} - 1) \times 1.8 \times 10^{-5} \times 100 - 1.5$

$l_{Fe} \times 10^{-5} \times 100 (1.2 - 1.8) = -1.8 \times 10^{-3} - 1.5$

$l_{Fe} \times 10^{-3} \times (-0.6) = -1.5018$

$l_{Fe} = \frac{1.5018 \times 10^{-3}}{0.6 \times 10^{-3}} = 2.503 \text{ mm} = 2.503 \text{ m}$

۲۱۷ نرینه ۲ متوسط

$Q_{\text{ج}} = Q_{\text{ع}} + Q_{\text{د}} + Q_{\text{ر}}$
 $Q = 2 \times 2100 \times (0 - (-5)) + 2 \times 3300 \times 10^3 + 2 \times 2000 \times 10^3$

$Q = 2100 + 67 \times 10^3 + 42 \times 10^3 = 111,1 \text{ kJ}$

۲۲

$$B_T = \frac{\mu_0}{4\pi} \times \frac{I}{r^2} = \frac{\mu_0}{4\pi} \times \frac{100\pi}{r^2}$$

$$B_T = 0$$

گزینه ۴ متوسط ۲۲۵

$$A = \pi r^2 = \pi \times (0.1)^2 = \pi \times 10^{-2} \text{ m}^2$$

$$R = \omega L, N=1$$

$$C_{\text{ind}} = 1$$

$$E = -N \frac{d\Phi}{dt} = -1 \times A \times C_{\text{ind}} \times \left(\frac{dB}{dt} \right)$$

$$E_1 = -\pi \times 10^{-2} \times \frac{10}{0.1} = -1 \text{ V}$$

$$P_1 = \frac{V^2}{R} = \frac{1 \times 1}{1} = 1 \text{ W}$$

$$E_2 = -\pi \times 10^{-2} \times \frac{10}{0.1} = -1 \text{ V}$$

$$P_2 = \frac{V^2}{R} = \frac{1 \times 1}{1} = 1 \text{ W}$$

$$m = 100 \text{ g} = 0.1 \text{ kg}$$

$$A = 10 \text{ cm} = 0.1 \text{ m}$$

$$\frac{T}{f} = \frac{1}{f} \rightarrow T = 1 \text{ (s)} \Rightarrow \omega = \frac{2\pi}{T} = 2\pi$$

$$K_{\text{max}} = \frac{1}{2} m \omega^2 A^2 = \frac{1}{2} \times 0.1 \times (2\pi)^2 \times 0.1^2$$

$$= \frac{1}{2} \times 0.1 \times 4 \times \pi^2 \times 0.1 = 0.2 \text{ J}$$

$$= 20 \text{ mJ}$$

گزینه ۲ اسان ۲۲۷

گزینه ۱ اسان ۲۲۸

$$P_A = 4P_B \xrightarrow{\lambda = \frac{v}{f}} \lambda_A = \frac{1}{4} \lambda_B$$

$$v_A = v_B$$

$$\frac{\lambda}{4} = 2 \text{ cm} \Rightarrow \lambda = 8 \text{ cm} = 0.08 \text{ m}$$

$$K_A = K_B$$

$$L_A = L_B$$

$$m_B = \frac{1}{4} m_A$$

$$P_B = \frac{1}{4} P_A \xrightarrow{v} \frac{m_B}{v_B} = \frac{1}{4} \frac{m_A}{v_A}$$

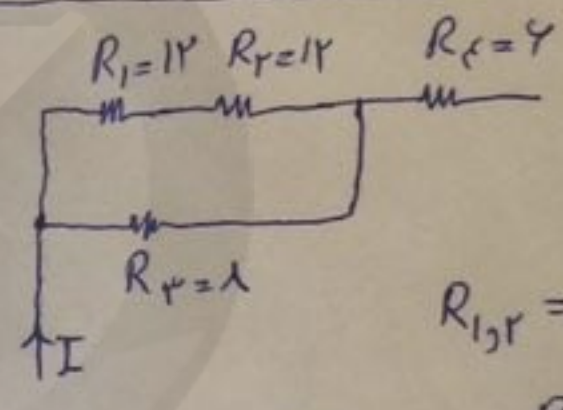
$$\Rightarrow \frac{1/4 m_A}{A_B \times v_B} = \frac{1}{4} \frac{m_A}{A_A \times v_A}$$

$$\frac{A_A}{A_B} = \frac{1/4}{1/4} = 1 \Rightarrow A_A = \frac{1}{4} A_B$$

$$R_A = R_B \Rightarrow \rho_A \frac{L_A}{A_A} = \rho_B \frac{L_B}{A_B}$$

$$\frac{1}{4} = \frac{\rho_B}{\rho_A} \Rightarrow 4$$

گزینه ۴ متوسط ۲۲۳



$$R_{1,2} = 24 \text{ ohms}$$

$$I_{1,2} = \frac{R_4}{R_{1,2} + R_4} I_{\text{total}}$$

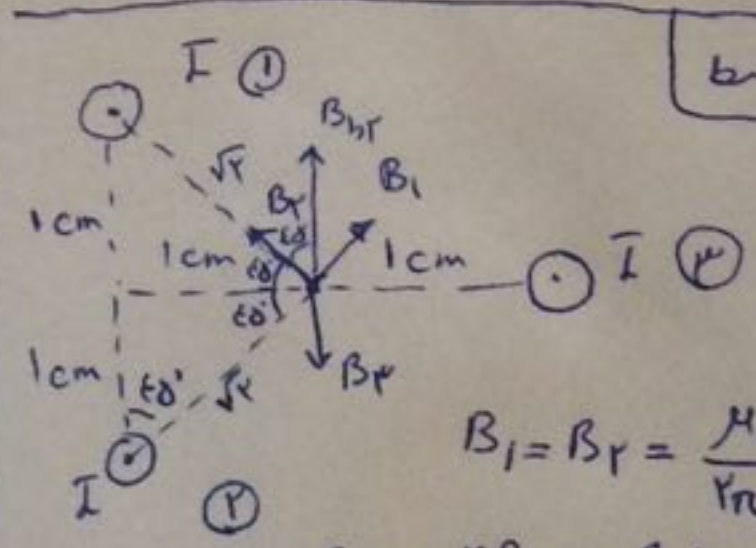
$$I_{1,2} = \frac{1}{24+1} I_{\text{total}} = \frac{1}{25} I_{\text{total}}$$

$$I_3 = I_{1,2}$$

$$\frac{P_3}{P_1} = \frac{R_3}{R_1} \times \left(\frac{I_3}{I_1} \right)^2 = \frac{2}{12} \times \left(\frac{1}{25} \right)^2$$

$$\frac{1}{2} \times 12 = 6$$

گزینه ۱ متوسط ۲۲۵



$$B_1 = B_2 = \frac{\mu_0}{4\pi} \times \frac{I}{\sqrt{2} \times 10^{-2}}$$

$$B_{1,2} = 2B_1 \cos\left(\frac{45^\circ}{2}\right) = 2 \times \frac{\mu_0}{4\pi} \times \frac{I}{\sqrt{2} \times 10^{-2}} \times \frac{\sqrt{2}}{2}$$

$$= \frac{\mu_0}{4\pi} \times 100 I$$

فزياء ۳۳۵ | نزيه اسان

$k_{max} = hf - W_0$

$\frac{4 \times 10^{-19}}{1.7 \times 10^{-14}} = 4 \times 10^{-14} \times \frac{3 \times 10^8}{\lambda \times 10^{-9}} - 2.5$

$2.5 + 2.5 = \frac{1200}{\lambda} \Rightarrow \lambda = \frac{1200}{5} = 240$

فزياء ۳۳۵ | نزيه اسان

$Z \rightarrow \frac{2.0 \times 10^{-18}}{\lambda} + \frac{1}{\lambda} + \frac{1}{\lambda}$

$A = 212$
 $Z = 12$

$V = \sqrt{\frac{F}{\mu}} = \sqrt{\frac{F}{\rho \times A}} = \sqrt{\frac{312}{1800 \times 1 \times 10^{-4}}} = \sqrt{173.33} = 13.16 \text{ m/s}$

$\mu = \frac{m}{l} = \frac{\rho \times A \times l}{l} = \rho \times A$

$\lambda = \frac{V}{f} \Rightarrow \frac{f}{10} = \frac{13.16}{f} \Rightarrow f = 131.6 \text{ Hz}$

فزياء ۳۳۵ | نزيه اسان

$I = \frac{E}{t \times A} = \frac{1.5 \times 10^{-11}}{5 \times 10^{-2} \times 10^{-2}} = \frac{1.5 \times 10^{-11}}{5 \times 10^{-4}} = 3 \times 10^{-8} \text{ W/m}^2$

فزياء ۳۳۱ | نزيه اسان

$f = 4.0 \times 10^4 \text{ Hz}$

$\lambda = 17 \times 10^{-2} \times 10^{-2} \text{ m}$

$\lambda = \frac{v}{f} \Rightarrow 17 \times 10^{-4} = \frac{v}{4 \times 10^4}$

$v = 6.8 \times 10^{-1} \text{ m/s}$

$\Delta x = v \Delta t \Rightarrow \Delta x = 6.8 \times 10^{-1} \times 10^{-2}$

$\Delta x = 6.8 \times 10^{-3} = 6.8 \text{ mm}$

فزياء ۳۳۲ | نزيه اسان

$\Delta x = \frac{h}{m \lambda} \Rightarrow 9 \times 10^{-1} \times 10^{-3} = \frac{6.6 \times 10^{-34}}{m \lambda}$

$\Rightarrow \lambda = 4.8 \times 10^{-7} \text{ m}$

$E = hf = 1 \times 6.6 \times 10^{-34} \times \frac{3 \times 10^8}{4.8 \times 10^{-7}} = 4.125 \times 10^{-19} \text{ J}$

فزياء ۳۳۳ | نزيه اسان

$\frac{1}{\lambda} = R_H \left(\frac{1}{n^2} - \frac{1}{n^2} \right)$

$\frac{1}{112.5} = \frac{1}{100} \left(\frac{1}{n^2} - \frac{1}{n^2} \right)$

$\frac{100}{112.5} = \frac{1}{9} = \frac{1}{n^2} - \frac{1}{n^2}$

نزيه