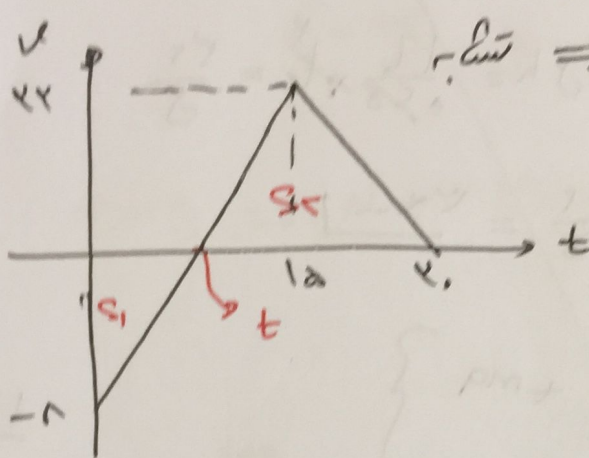


②

$$\Delta x = \frac{v_1 + v_2}{2} \Delta t \Rightarrow -12,8 = \frac{v_2 + 0}{2} \times 2 \Rightarrow (v_2 \neq 0) \Rightarrow$$

187



$$v = \frac{\Delta x}{\Delta t} \Rightarrow \frac{12}{2} = \frac{v_2}{2} \Rightarrow t = 2s$$

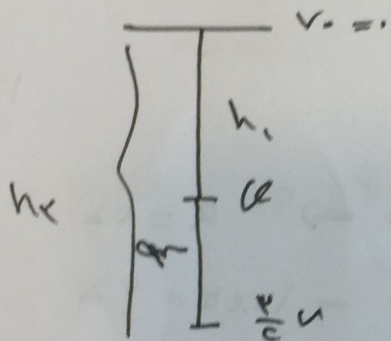
188

$$S_1 = \frac{1}{2} \times 2 \times 42 = 42$$

$$S_2 = \frac{1}{2} \times 4 \times 42 = 84$$

$$S_{\text{total}} = S_1 + S_2 = 42 + 84 = 126$$

189

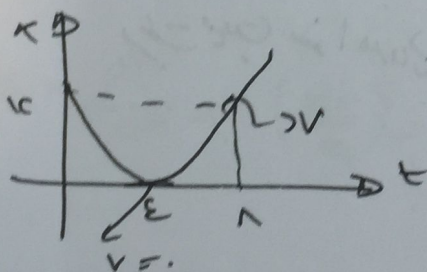


$$v^2 - v_0^2 = -2gh \Rightarrow$$

$$\left(\frac{v}{c}\right)^2 - 0 = 2 \times 1 \times 2 \Rightarrow v = 2$$

$$h_1 = \left| \frac{-v^2}{2g} \right| = \left| \frac{-(2)^2}{2 \times 1} \right| = 2$$

$$h_{\text{total}} = h_c = h_1 + 2 = 4$$



$$\Delta x = \frac{v_1 + v_2}{2} \Delta t$$

$$\Rightarrow -12 = \frac{v_2 + 0}{2} \times 2 \Rightarrow v_2 = -7$$

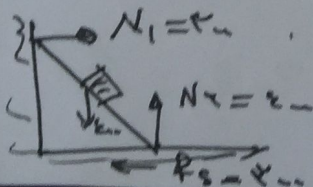
$$\Rightarrow v = 7 \text{ m/s}$$

190

$$\Delta x = -\frac{v_0^2}{2a} \Rightarrow 2 = -\frac{v_0^2}{2 \times 1} \Rightarrow a = -1 \text{ m/s}^2$$

191

$$F = -ma \Rightarrow F = -2 \times (-1) = 2 \text{ N}$$



$$R = \sqrt{N_1^2 + F_s^2} = \sqrt{2^2 + 2^2} = 2\sqrt{2} \text{ N}$$

②

170

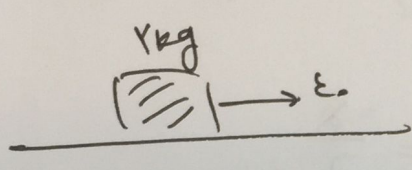
$$\frac{g_h}{g_e} = \left(\frac{R_e}{R_e + h} \right)^2, \quad g_h = \left(\frac{R_e}{R_e + h} \right)^2 g_e = \frac{32}{2}$$

$$F = mg = 8 \times \frac{32}{8} = 32$$

$$N > mg \Rightarrow N = m(g + a) \Rightarrow \text{کنترل پس} \Rightarrow \text{تیز تر} \sim 171$$

172

$$F - f_k = ma$$



$$2 \times 8 \times 2 = 2a \Rightarrow a = 12$$

$$\text{for } t = 2 \Rightarrow v = 12 \times 2 = 24$$

$$p_{20} \Rightarrow 10 - 10 = 2(a) \Rightarrow a = 0$$

در حالت تعادل

173

$$W = -mgh \Rightarrow v_1 = W_1 = W_2$$

$$k = \frac{P}{cm} \Rightarrow \left(\frac{k_c}{c_1} \right) = \left(\frac{P_c}{P_1} \right)^2 = \left(\frac{22}{1} \right)^2 = \frac{484}{1} \Rightarrow 484$$

$$E_A = 2 \times 10 \times (0.1 + h') + \frac{1}{2} \times 2 \times 2 = 1 + 2h' \quad j \quad 174$$

$$E_C = 10 \quad j$$

$$E_A = E_C \Rightarrow 10 = 1 + 2h' \Rightarrow h' = 4.5 \text{ cm}$$

$$h' = x \times 8.13 \Rightarrow 10 = x \times \frac{1}{2} \Rightarrow x = 20 \text{ cm}$$

178

$$\frac{v_2}{v_1} = \frac{3}{4}$$

$$\frac{v_2}{v_3} = 1.5$$

$$\frac{n_2}{n_3} = ? = \frac{v_2}{v_3}$$

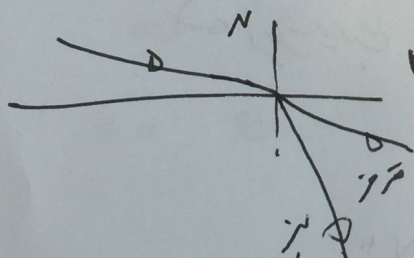
$$n_1 \sin \theta_1 = n_2 \sin \theta_2 \Rightarrow \frac{n_1}{n_2} = \frac{v_2}{v_1} = \frac{v}{\lambda}$$

$$\Rightarrow \frac{v_2}{v_1} \times \frac{v_2}{v_3} = \frac{v_2}{v_3} \times \frac{v_2}{v_1} \Rightarrow$$

$$\frac{3}{4} \times 1.5 = \frac{v_2}{v_3} \times \frac{v}{\lambda} \Rightarrow \frac{v_2}{v_3} = \frac{7}{2}$$

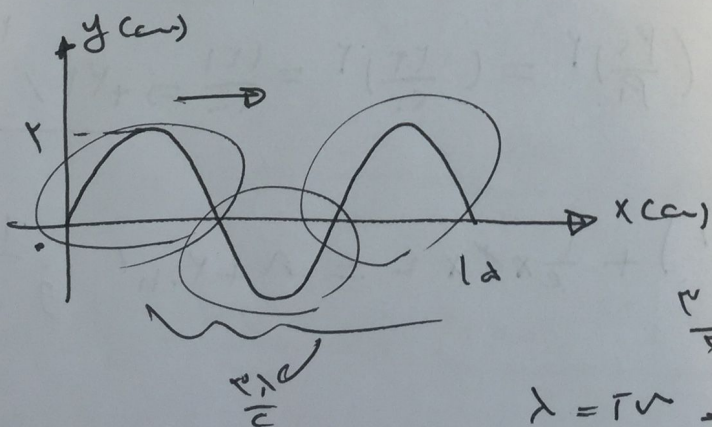
$$\Rightarrow \frac{n_2}{n_3} = \frac{7}{2}$$

179 سبز < قرمز $\Rightarrow \lambda_{\text{سبز}} > \lambda_{\text{قرمز}}$: در این



سبز < قرمز $\Rightarrow n_{\text{سبز}} > n_{\text{قرمز}}$

$$\Rightarrow \lambda_{\text{قرمز}} > \lambda_{\text{سبز}}$$



$$v = \sqrt{\frac{F}{\mu}} = \sqrt{\frac{\lambda_0}{\mu_0}} = c$$

$$\frac{v}{\lambda} = f \Rightarrow \lambda = 0.1 \text{ m}$$

$$\lambda = vT \Rightarrow T = \frac{\lambda}{v}$$

$$\frac{t}{T} = \frac{1}{\frac{1}{f}} = f \Rightarrow t = fT$$

$$e \cdot \omega = \epsilon_0 \cdot E \cdot A = 2 \times 10^{-12} \text{ C}$$

$$Q \quad v = \sqrt{\frac{F}{\mu}} = \sqrt{\frac{28.}{\epsilon \times 10^{-12}}} = \frac{2}{\cancel{10}} \times 10^6 = 28. \quad \underline{171}$$

$$\lambda = \frac{v}{f} = \tau v = \frac{28.}{4 \times 10^8} = 0.07 \text{ m} \quad \underline{172}$$

$$T = 2\pi \sqrt{\frac{L}{g}} \Rightarrow \frac{T_2}{T_1} = \sqrt{\frac{L_2}{L_1} \times \frac{g_1}{g_2}} \Rightarrow \frac{1}{2} = \sqrt{\frac{L_2}{L_1}} \Rightarrow \frac{L_2}{L_1} = \frac{1}{4} \Rightarrow L_2 = 2.5 \text{ cm} \quad \underline{173}$$

$$\lambda_0 - \lambda_0 = \frac{20 \text{ cm}}{2} \quad \text{با 2.5 cm من رهم}$$

$$\begin{cases} E = K + U \\ U = K \end{cases} \Rightarrow 2K = E \Rightarrow K = \frac{E}{2} = \frac{1}{2} \epsilon mg$$

$$K = \epsilon \times 10^{-12} = \frac{1}{2} \times 10 \times 10^{-12} \times v^2 \Rightarrow v = \frac{\sqrt{c}}{2} \quad \underline{174}$$

$$\begin{cases} E = p \cdot t \\ \epsilon_i = \epsilon_c \end{cases} \Rightarrow \left(n \frac{hc}{\lambda} \right)_{\text{بنفش}} = \left(n \frac{hc}{\lambda} \right)_{\text{زرد}} \Rightarrow \frac{\lambda_{\text{بنفش}}}{\lambda_{\text{زرد}}} = \frac{n_{\text{زرد}}}{n_{\text{بنفش}}} = \frac{4.0}{\epsilon_m} = \frac{4}{c} \quad \underline{175}$$

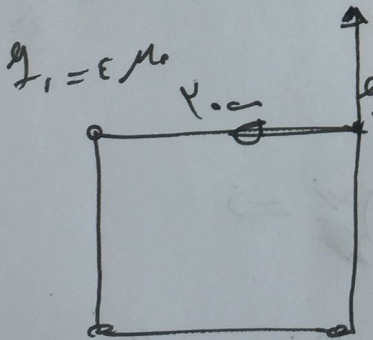
$$W_0 = h f_0 = \frac{hc}{\lambda_0} \Rightarrow \frac{\epsilon \epsilon \times 10^{-12} \times 10 \times 10^{-12}}{\lambda_0} = 4.1 \text{ eV} \quad \underline{176}$$

$$\Rightarrow \lambda_0 = 2.9 \times 10^{-7} \text{ m} = 290 \text{ nm} \quad \underline{177}$$

$$2 \times 10^5 - 1 \times 10^5 = \underline{1 \times 10^5}$$

$q_{f.o.} = -0.4 \text{ Mc}$
 $\int A = 15.4$
 $v_B = ?$
 $\Delta U = -\Delta m \cdot g$
 $\frac{1 \text{ m}}{1 \text{ s}}$

$$\Delta V = V_B - V_A \Rightarrow V_B = \underline{44.5 \text{ V}}$$



$$F_{\text{rx}} \cdot \epsilon_0 = \epsilon_{\text{rx}} \Rightarrow F_{\text{rx}} = \epsilon_{\text{rx}} \sqrt{\epsilon_0}$$

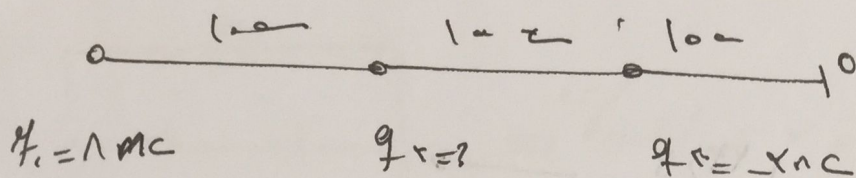
$$\Rightarrow |f(r)| = \sqrt{c} \Rightarrow$$

$$g_{rr} = -1/c^2$$

1A.

(4)

(18)



$$\epsilon_1 = \frac{2 \times 10^{-9} \times 10 \times 10^{-9}}{0.109} = 1.00$$

$$\Rightarrow \epsilon_T = \epsilon_c - \epsilon_1 = 1.00$$

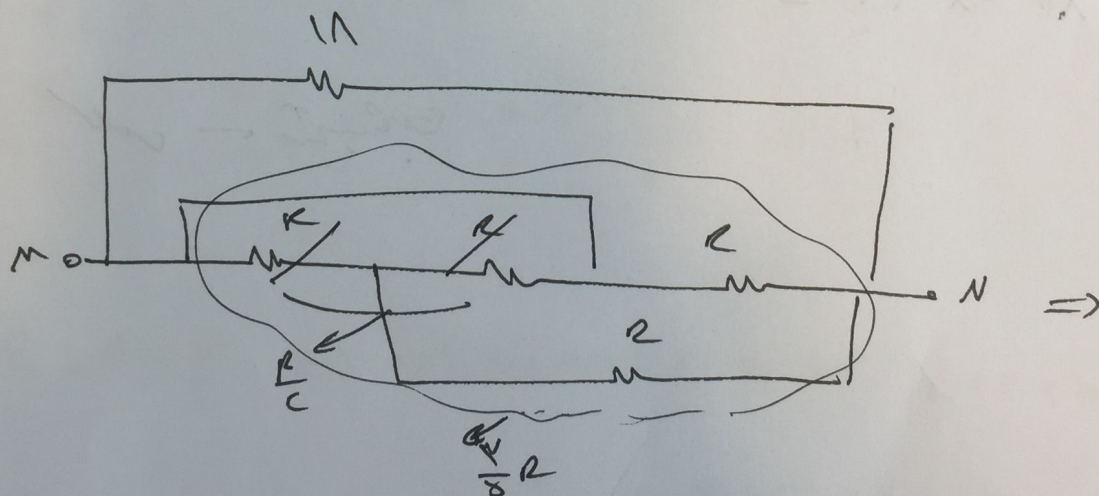
$$\epsilon_c = \frac{2 \times 10^{-9} \times 2 \times 10^{-9}}{0.101} = 1.00$$

$$\epsilon_c = \frac{2 \times 10^{-9} \times q_c}{0.102} = 1.00 \Rightarrow q_c = 5 \text{ nC}$$

$$\frac{V_2}{V_1} = \left(\frac{r_c}{r_1} \right)^2 = \left(\frac{15}{5} \right)^2 = \frac{9}{12}$$

(18)

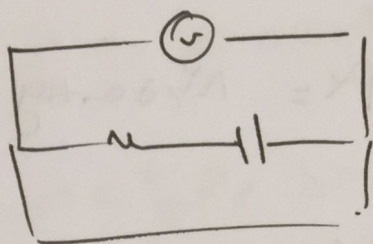
(18) ندرت مقاومت حساب به خاطر باشد که سبتر بآن به دو مقاومت معمول متغیر است.



(18)

$$\Rightarrow \frac{8}{3R} + \frac{1}{1A} = \frac{1}{R} \Rightarrow R = 2/$$

$$A \text{ ب. ج. } = m_A = \frac{1}{R} \quad m_B = \frac{1}{R} \Rightarrow \frac{R_B}{R_A} = \frac{m_A}{m_B} = \frac{1}{1} = \frac{1}{1} \quad (18)$$



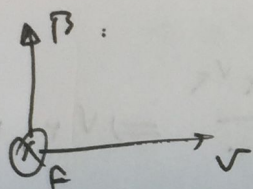
$$\Rightarrow \text{قوة} / = V = 0$$

117

$$B = \frac{\mu \cdot N I}{r R} \Rightarrow A = \pi R^2 \Rightarrow 4 \epsilon \pi = \pi R^2 \Rightarrow R = \Lambda$$

$$B = \frac{0.001 \times \Lambda \times \epsilon \pi \times 1}{0.001 \times \Lambda} = 1 \cdot \pi$$

118



119

$$\varphi\left(\frac{1}{\epsilon}\right) = \epsilon x 1 \times \frac{\pi}{\epsilon} = 0$$

$$\varphi\left(\frac{1}{\epsilon}\right) = \epsilon x 1 \times \pi = -\epsilon x 1$$

$$\epsilon = -N \frac{\Delta \varphi}{\Delta t} = -\gamma \cdot x \frac{-\epsilon x 1}{\frac{1}{\epsilon}} = \epsilon \Lambda$$

120

$$\epsilon = B L v \Rightarrow 0.12 = 0.15 \times \frac{1}{\epsilon} \times v \Rightarrow v = 2 \text{ m/s}$$



قوة مغناطيسية = $\frac{1}{2} B L v$

$$P_{\text{mech}} = f g h = 1 \times 1 \times \frac{1}{2} = 0.5 \text{ Pa}$$

121

$$\gamma \quad p_0 = p_1 = \gamma \delta \text{ ارتفاع}$$

$$\frac{p_1 v_1}{T_1} = \frac{p_c v_c}{T_c} \Rightarrow \frac{\gamma \delta}{\gamma_{\text{ح.}}} = \frac{p_c}{\gamma_{\text{ح.}}} \Rightarrow p_c = \gamma \delta \text{ ارتفاع}$$

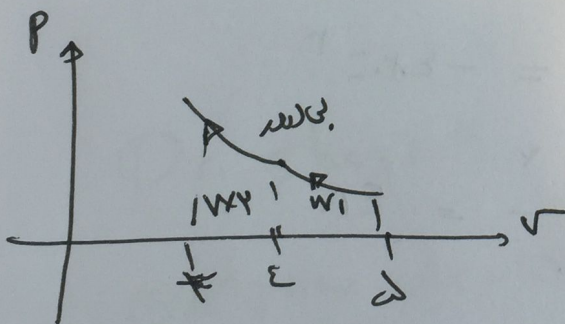
$$p_c = \gamma \delta = p_0 + h \Rightarrow \underline{h = \gamma \delta}$$

$$\frac{\gamma}{h - h_1} = \frac{1 - \gamma}{h_1} \Rightarrow h_1 = \frac{\gamma}{1 - \gamma} h$$

192

$$\frac{p_1 v_1}{T_1} = \frac{p_c v_c}{T_c} \Rightarrow \frac{1/\gamma \times 1.8 \times 10^3}{\gamma_{\text{ح.}}} = \frac{1.8 \times \gamma_c}{\gamma_{\text{ح.}}} \Rightarrow \gamma_c = \gamma, \gamma$$

$$\gamma_c - \gamma_1 = \gamma, \gamma - 1.8 = 1.8$$



$$\Rightarrow W_c > W_1$$

$$Q_c = \Delta U + W \Rightarrow \Delta U = W$$

$$\Delta U_c > \Delta U_1$$

نیم

193

$$|Q_H| = \frac{\Delta}{\epsilon} Q_c = Q_c + W \Rightarrow W = \frac{Q_c}{\epsilon}$$

194

$$k = \frac{Q_c}{W} = \epsilon \Rightarrow k = \epsilon$$

195

$$\Delta U = n C_{Mv} \Delta T = \frac{\gamma}{\gamma - 1} n R \Delta T = \frac{\gamma}{\gamma - 1} (p_c v_c - p_a v_a)$$

$$p_{Hx} \delta = 1.8 \times 10^3 \Rightarrow p_b = p_a = \frac{1}{8} \times 1.8$$

$$\Delta U = \frac{\gamma}{\gamma - 1} (1 - \gamma_c) = \gamma_c$$

$$\gamma \quad Q_{O_2} = Q_{He}$$

198

$$\text{خزانه} \Rightarrow N = 0 \Rightarrow \Delta U = Q + W = Q$$

$$\Delta U_{He} = \Delta U_{O_2} \Rightarrow n = 1$$

$$Q_{He} = n \times \frac{5}{2} R \times \Delta T_{He}$$

$$\Rightarrow \frac{5}{2} \Delta T_{He} = \frac{5}{2} \Delta T_{O_2} \Rightarrow$$

$$Q_{O_2} = n \times \frac{5}{2} R \times \Delta T_{O_2}$$

$$\Delta T_{He} > \Delta T_{O_2} \Rightarrow K > 1$$

199

$$F = 1,180 + 22 \Rightarrow 122 = 1,180 + 22 \Rightarrow Q = 8.$$

$$T = 273 + Q = 273 + 8 = 281$$

هم در قیاس نانوژ هم نانو لام خنک کانی و وید. ← در نانو

Dr. Hegka

مفت: 2