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"شمیبه نامه"

دکتر مهرداد سلیمی - متخصص فیزیک هسته ای



تشریح سوالات فیزیک تجربی - دی ماه ۱۴۰۱

$$\bar{v} = \frac{v_0 + (-v_0)}{2} = -\frac{v_0}{2}$$

۴۶
ریشه اول

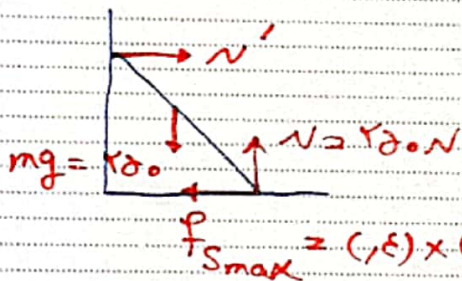
$$\bar{s}_1 = \frac{l}{\Delta t} = \frac{1}{1} = \frac{1}{1} \frac{m}{s}$$

۴۵
ریشه اول

$$\bar{s}_2 = \frac{l_1 + \Delta r}{\Delta t_1 + \Delta t_2} = \frac{1 + (\frac{1}{1} (\frac{1}{2}))}{1 + \frac{1}{2}} = \frac{1.5}{1.5} = \frac{1}{1} \frac{m}{s}$$

$$\Rightarrow \frac{\bar{s}_1}{\bar{s}_2} = \frac{1}{1}$$

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ریشه اول



$$N = 200 \text{ N}$$

۴۵
ریشه اول

$$f_{\text{max}} = (\mu) \times (200) = 100 \text{ N}$$

$$\frac{g'}{g} = \left(\frac{r}{r'}\right)^2 \Rightarrow \frac{g'}{9.8} = \left(\frac{200}{100}\right)^2$$

۴۵
ریشه اول

$$g' = 9.8 \times \left(\frac{2}{1}\right)^2 = 39.2 \frac{m}{s^2}$$



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$$P_{max} = m v_{max}$$

$$2 \times 10^{-3} \pi = 10^{-7} v_{max} \Rightarrow v_{max} = 2 \times 10^{-2} \pi \frac{m}{s}$$

$$E = \frac{1}{2} m (v_{max})^2 = \frac{1}{2} \times 10^{-1} \times (2 \times 10^{-2} \pi)^2 = 2 \times 10^{-4} \pi^2 = 20 \pi^2 \mu J$$

$$|a| = \omega^2 r \Rightarrow \frac{a}{r} = \omega^2 \Rightarrow \omega = \sqrt{\frac{a}{r}} \text{ rad/s}$$

$$v_{max} = A\omega \Rightarrow v_{max} = (10^{-4}) \times (\sqrt{\frac{a}{r}}) = \frac{a}{\sqrt{r}} \frac{m}{s}$$

ذره a در حال نوسان آکون بوده است. شعاع نوسان r و طول موج λ و چون λ ذره λ کمتر می‌باشد، لذا نسبت ذره λ به λ کم می‌ماند.

$$\beta = 10 \log \frac{I}{I_0} = 10 \log (2 \sqrt{10} \times 10^4)$$

$$= 10 \left[\log 2 + \frac{1}{2} \log 10 + 4 \log 10 \right] = 10 \left[0.3 + 0.5 + 4 \right] = 48.7 \text{ dB}$$

$$f_2 - f_1 = \frac{c}{\lambda_2} - \frac{c}{\lambda_1} = c \left(\frac{1}{\lambda_2} - \frac{1}{\lambda_1} \right)$$

$$\frac{3 \times 10^8}{2 \times 10^8} = \frac{1}{\lambda_2} - \frac{1}{\lambda_1} = \frac{30}{\lambda_2} \frac{1}{\mu m}$$

$$n = 2 \Rightarrow \frac{1}{\lambda_2} = \frac{1}{100} \left(\frac{1}{2} - \frac{1}{\lambda_1} \right) = \frac{30}{\lambda_2} \frac{1}{\mu m}$$

$$n = 3 \Rightarrow \frac{1}{\lambda_2} = \frac{1}{100} \left(\frac{1}{3} - \frac{1}{\lambda_1} \right) = \frac{30}{\lambda_2} \frac{1}{\mu m}$$

$$\Rightarrow \frac{10}{\lambda_1} - \frac{30}{\lambda_2} = \frac{30}{\lambda_2} \frac{1}{\mu m}$$





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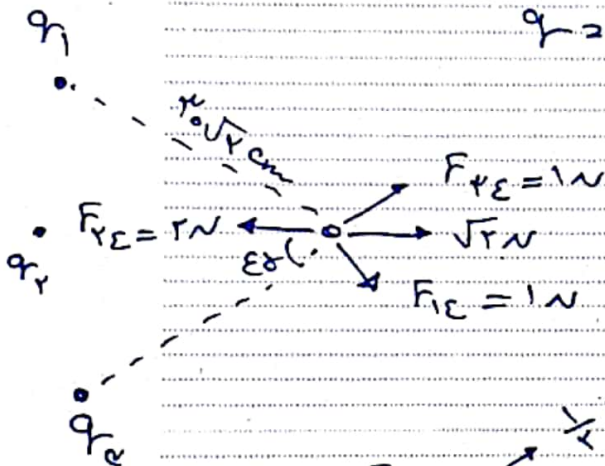


$$hf = E_U - E_L$$

$$f = \frac{1.8e - (-1.37e)}{6.6 \times 10^{-34}} = 3.74e \times 10^{15} \text{ Hz}$$

$$mg = Eq \Rightarrow q = \frac{mg}{E} = \frac{2 \times 10^{-2} \times 10}{1.2} = 2 \times 10^{-2} \text{ C}$$

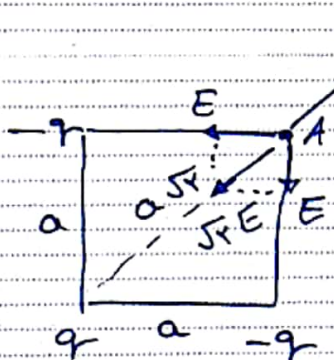
$$q = -2 \mu\text{C}$$



$$F_{yE} = F_{yE} = \frac{q \times 1.0 \times 2}{9.0 \times 10^9} = 1 \text{ N}$$

$$F_{yE} = 2 \text{ N} \Rightarrow 2 = \frac{q \times 9.0 \times 2}{9.0}$$

$$\Rightarrow q = -1.0 \mu\text{C}$$



$$E_A = \sqrt{2} E - \frac{1}{2} E$$

$$E'_A = \sqrt{2} E$$

$$E'_A - E_A = \frac{1}{2} E = \frac{1}{2} \times \frac{9 \times 10^9 \times 2}{9.0}$$

$$\Rightarrow E'_A - E_A = 1000 \frac{\text{N}}{\text{C}}$$

$$R_{eq} = R_T = 1.0 \Omega$$

$$I = \frac{E}{R_T + r} = \frac{1 \text{ V}}{1 \Omega} = 1.0 \text{ A}$$

$$I' = I - 1.2 = 1.2 \text{ A} = \frac{\Delta}{E}$$



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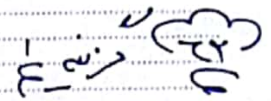
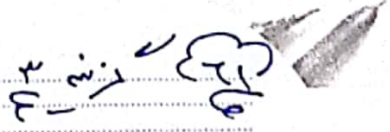
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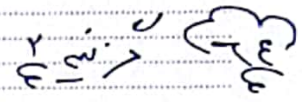
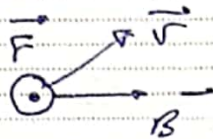
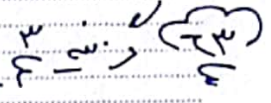


$$\frac{q}{\epsilon} = R' \left(\frac{12}{12+R'} \right)^2$$

$$\Rightarrow R'_1 = \epsilon R, \quad R'_2 = 3\epsilon R$$

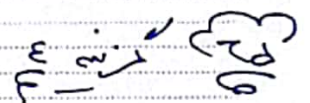


$$B = \frac{\mu_0 n I}{L} = \frac{12 \times 10^{-7} \times 2 \times 10^2 \times 1 \times 10^{-1}}{2 \times 10^{-1}} = 24 \times 10^{-6} T = 24 \mu T = 2 \epsilon G$$



$$I = I_m \sin\left(\frac{2\pi}{T} t\right)$$

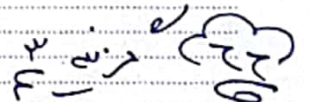
$$I = 2 \sin\left(100\pi \left(\frac{\pi}{\epsilon_0}\right)\right) = 2 \sin \frac{2\pi}{\epsilon} = \frac{2\sqrt{2}}{\epsilon} A$$



$$(Pgh)_{\text{موجود}} + P_{\text{جو}} = (Pgh)_{\text{مغ}}$$

$$\frac{124000 \times 10 \times \frac{25}{100} - 220000}{\epsilon} = \rho \times 10 \times \frac{1}{\epsilon}$$

$$\rho = 1100 \frac{kg}{m^3}$$



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$$\rho_2 - \rho_1 = \rho g h$$

$$\epsilon_{000} = \rho \times 10 \times \frac{2}{10} \Rightarrow \rho_{\text{غ}} = \frac{2000 \text{ kg}}{m^3} = \frac{2000 \text{ g}}{\text{Lit}}$$

$$\Delta E = W_f$$

$$E_2 = E_1 + W_f$$

$$K_2 + U_2 = K_1 + U_1 + W_f$$

$$\frac{1}{2} m (\epsilon_{000}) + m(10)(242) = \frac{1}{2} m (\epsilon_{000}) + 0 + W_f$$

$$W_f = -240 \text{ J} \Rightarrow \frac{W_f}{K_1} \times 100 = \frac{-240}{2200} \times 100 = \frac{1}{9} \times 100 = 11.1\%$$

$$W_{mg} = -mg \Delta h = -2 \times 10 \times 1.8 = -10 \text{ J}$$

$$\Delta F = \frac{q}{\Delta} \Delta \theta \Rightarrow 122 - (-28) = \frac{q}{\Delta} \Delta \theta \Rightarrow \Delta \theta = 100^\circ$$

$$\Delta L = d L_1 \Delta \theta = 1.2 \times 10^{-2} \times 1188 \times 10^{-2} = 1.4 \text{ m}$$

$$-10 \text{ J} \xrightarrow{Q_1} 0 \text{ J} \xrightarrow{Q_2} 10 \text{ J} \xrightarrow{Q_3} 10 \text{ J}$$

$$Q_t = Q_1 + Q_2 + Q_3 = m \left(\frac{1}{2} c\right) (10) + m(10c) + m c(10)$$

$$Q_t = 92 \times \frac{1}{2} \times 42 = 1918 \text{ kJ}$$



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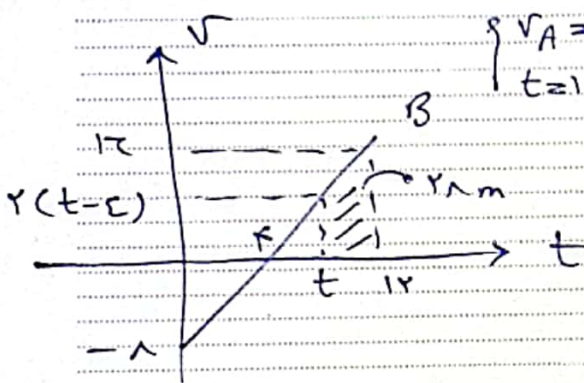


۲ روزنه

۳ روزنه

۴ روزنه

۵ روزنه



$$v_A = -\frac{24}{12} = -2 \frac{m}{s}$$

$$t = 12.5 \Rightarrow v_B = \frac{12}{4} (2) = 212 \frac{m}{s}$$

$$28 = \left(\frac{2t+8}{2}\right)(12-t) = (t+14)(12-t)$$

$$\Rightarrow t = 10.5$$

$$\rightarrow \lambda_A = -2(10.5) + 28 = 48m$$



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