

۲(۴۶)

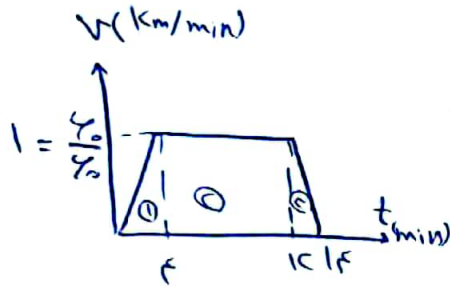
$$\frac{E_1}{E_2} = \frac{\lambda_2}{\lambda_1} = \frac{400 \text{ nm}}{500 \text{ nm}} = 0.8 \quad \leftarrow E = hf = h\frac{c}{\lambda} \Rightarrow E \propto \frac{1}{\lambda}$$

۳(۴۷)

۱(۴۸)

$$\phi = \frac{1}{2} \pi$$

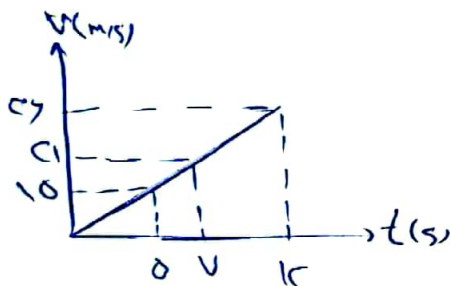
۴(۴۹)



$$s_1 = \frac{1 \times 10}{2} = 5, \quad s_2 = 10 \times 1 = 10 \rightarrow 10.5 \text{ km}$$

$$s_3 = \frac{(10+0) \times 1}{2} = 5.5$$

۲(۵۰)



$$214 = \frac{10 \times 20}{2} = 100$$

$$\frac{(10+0) \times 10}{2} = 50 \rightarrow \checkmark$$

۳(۵۱) - هم نمودار v-t

$$|V_{avg}| = \frac{\Delta v}{\Delta t} = \frac{10 - 20}{10} = 1 \text{ m/s}$$

۳(۵۲)

$$v_A = \frac{1}{t} t - 10 \rightarrow a_A = \frac{1}{t} t^2 - 10t - 10 \rightarrow a_A = -10 \rightarrow t = 10 \text{ s}$$

۲(۵۳)

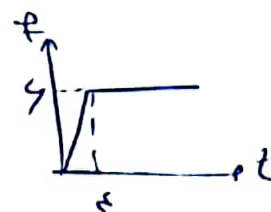
$$v_B = -\frac{1}{t} t + 10 \rightarrow a_B = -\frac{1}{t} t^2 + 10t + 10 \rightarrow a_B = 10 \rightarrow \frac{100 \text{ m}}{10} = 10 \text{ m}$$

$$F_N = mg - F_c \uparrow \Rightarrow F_N \downarrow \rightarrow \text{اما زاویه تغییر نمی کند}$$

۴(۵۴)

$$F = \frac{v}{t} \rightarrow F = 4 \Rightarrow t = 5 \text{ s}$$

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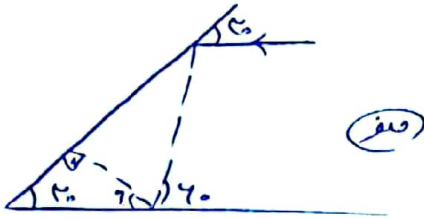


۱(۵۵)

$$W = mg \rightarrow r \times \left(\frac{1}{r}\right)^2 = \frac{1}{r^2}$$

$$g \rightarrow \frac{M}{r^2}$$

۲ (۵۶)



(صف)

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۴ (۵۷)

$$E = K + U \rightarrow U = E - K$$

۱ (۵۸)

$$E = \frac{1}{2} K v^2 \rightarrow E = \frac{1}{2} \times 5.0 \times 4^2 \times 10^{-6} = 0.4 \text{ J} \Rightarrow U = 0.18 \text{ J}$$

$$K = \frac{1}{2} m v^2 = \frac{1}{2} \times 5 \times 0.4^2 = \frac{14}{100}$$

$$v_{\max} = A\omega \rightarrow v_{\max} = \frac{A \times 2\pi}{T} \Rightarrow T = \frac{A \times 2\pi}{v_{\max}}$$

$$\omega = \frac{2\pi}{T}$$

۴ (۵۹)

$$T = \frac{5 \times 10^{-5} \times 2 \times \frac{22}{7}}{55 \times 10^{-1}} = 0.15$$

۳ (۶۰)

$$E = hf = \frac{hc}{\lambda} \rightarrow P t = \frac{n h c}{\lambda} \rightarrow n = \frac{P t \lambda}{h c} \Rightarrow n = \frac{443 \times 10^{-9} \times 40 \times 4.0 \times 10^{-9}}{440 \times 10^{-34} \times 3 \times 10^8} = 1.5 \times 10^5$$

۲ (۶۱)

$$E = P t$$

$$\frac{1}{\lambda_1} = R \left(\frac{1}{\infty} - \frac{1}{\infty^2} \right) \rightarrow \lambda_1 = \frac{20 \times 10^9}{11R}$$

۱ (۶۲)

$$n = 4$$

$$\frac{20 \times 10^9}{11R} = \frac{34}{11}$$

$$\frac{1}{\lambda_c} = R \left(\frac{1}{\infty} - \frac{1}{\infty^2} \right) \Rightarrow \lambda_c = \frac{20}{R}$$

$$n = \infty$$

$$9 \times 10^9 \times \frac{39}{9 \times 10^{-6}} = 1.1 \times 10^{-9} \times 1. \rightarrow q = 5 \times 10^{-12}$$

۲ (۶۳)

$$n = \frac{39}{e} = \frac{10 \times 10^{-11}}{1.6 \times 10^{-19}} = 9.1375 \times 10^8$$

$$\frac{F_{rc}}{F_{ic}} = \frac{k q_1 q_c}{k q_1 q_c} \rightarrow \frac{4 \times 10^{-9}}{1 \times 10^{-9}} = \frac{1 q_1}{9_1} \times \frac{1}{1} \rightarrow \frac{q_c}{q_1} = - \frac{4}{1}$$

$$\frac{R_A}{R_B} = \frac{\rho_A}{\rho_B} \times \frac{L_A}{L_B} \times \frac{A_B}{A_A} \Rightarrow 1 = 2 \times \frac{A_B}{A_A} \Rightarrow \frac{A_B}{A_A} = \frac{1}{2}$$

۴ (۴۵)

$$\frac{\rho_A}{\rho_B} = \frac{m_A}{m_B} \times \frac{V_B}{V_A} \rightarrow \frac{L_B}{L_A} \times \frac{A_B}{A_A} \Rightarrow 2 = \frac{m_A}{m_B} \times \frac{1}{2} \rightarrow \frac{m_A}{m_B} = 4$$

 $R_1, R_c \rightarrow$ دراز

$$\Rightarrow R_c = 4 \Omega, I = \frac{V_0}{1+4} = 2A$$

۳ (۴۶)

 $R_1, R_c \rightarrow$ موازی، R_c ب

: ۱- ۲

$$I_{R_c} = 1A \rightarrow P_{R_c} = 4 \times 1^2 = 4W$$

$$R_c, R_e \rightarrow \text{موازی} \rightarrow 12 \Omega \rightarrow \text{موازی} \rightarrow 4 \Omega$$

: ۲- ۳

$$I = \frac{V_0}{1+4} = 4A \rightarrow I_{4\Omega} = \frac{4}{5} A \rightarrow P_{R_c} = 4 \times \frac{16}{9} = \frac{64}{9} W$$

$$P_c - P_1 = \frac{16}{9} W$$

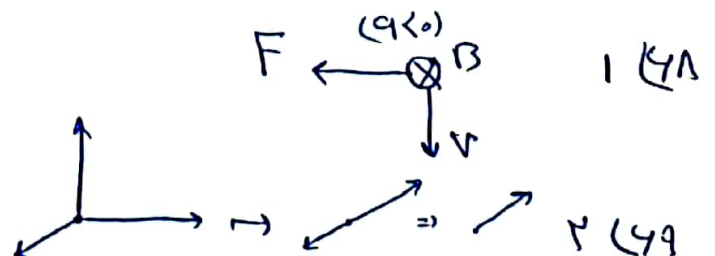
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$$I_{\text{سج}} = \frac{V_{\text{سج}}}{R_0} = 0.1A \rightarrow I_{R_c} = 0.1A \rightarrow R_c = 110 \Omega \quad \text{ب}$$

۵ (۴۷)

$$V_{\text{آبسیج}} = d \times 1.4 = 1.4V$$

$$V_{\text{کل}} = V_c \rightarrow V_{R_1} = 4.4V \Rightarrow R_1 = \frac{4.4}{1.4} = 3.14 \Omega$$



۱ (۴۸)

۲ (۴۹)

$$|I| = \frac{N \Delta \phi}{R \Delta t} = \frac{200 \times 20 \times 10^{-6}}{20 \times 2 \times 10^{-3}} = 1.28 A$$

(۷۰)

$$V \Delta \phi \cdot A \Delta B \Delta S \Delta \theta = d_0 \times 10^{-6} \times d \times 10^{-6} \times 1 = 20 \times 10^{-6} W$$

$$V = \frac{m}{\rho} \cdot \frac{F_0}{\frac{F_0}{v_x}} = \frac{2\lambda\pi}{F} = \frac{F}{2\pi} \left(\frac{10a^2}{a^2} \right) \rightarrow a = 1 \text{ cm} \quad 4(V1)$$

$$P_0 + \rho g h_c - \rho g h_f = P_{j5} \rightarrow 10 \cancel{\text{N/m}^2} \times 1 \times \frac{1}{1} - 12 \cancel{\text{N/m}^2} \times 10 \times \frac{1}{1} = P_{j5} \quad 1(V2)$$

$$\hookrightarrow P_{j5} = -\Delta P = P_0 \quad P = \rho g h \rightarrow -\Delta P = 12 \cancel{\text{N/m}^2} \times 10 \times h \Rightarrow h = -8 \text{ mm}$$

← فاصله بزرگ mm بزرگ

$$W_f = \Delta K = \frac{1}{2} m (v_c^2 - v_i^2) \rightarrow \frac{1}{2} \times 20 (400 - 0) = 4000 \text{ J} \rightarrow 4 \text{ kJ} \quad 2(V3)$$

$$E_i = E_c \rightarrow k_i + U_i = k_c + U_c \Rightarrow \frac{1}{2} \times 400 = \frac{1}{2} \times 144 + 10 \times h_c$$

$$\Rightarrow h_c = 12 \text{ cm}$$

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$$P = \frac{Q}{t} \rightarrow m L v \rightarrow t = \frac{m L v}{P} = \frac{4 \times 2254}{2} = 4512 \text{ s} \rightarrow 9 \text{ h } 51 \text{ s} \quad 1(V5)$$