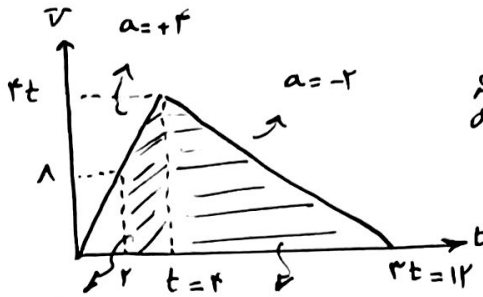


$$\frac{1}{\lambda} = R \left(\frac{1}{r} - \frac{1}{\infty} \right) = \frac{R}{r} \rightarrow \lambda = \frac{r}{R}$$

۲ - ۲۲



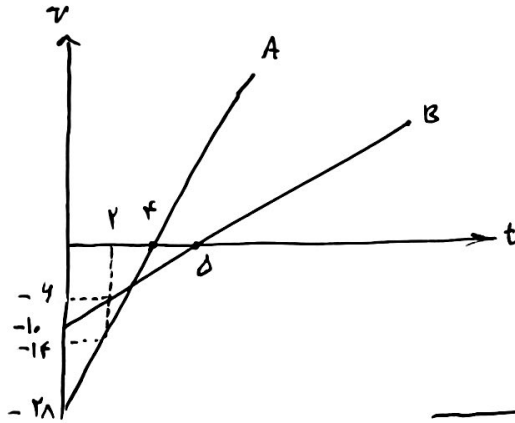
$$S_2 = \frac{2t \times 4t}{2} = 4t^2 = 96 \rightarrow t = 2s$$

۱ - ۲۳

$$\Delta x = S_1 + S_2 = 24 + 96 = 120m \quad v_{av} = \frac{\Delta x}{\Delta t} \rightarrow v_{av} = \frac{120}{10} = 12 \frac{m}{s}$$

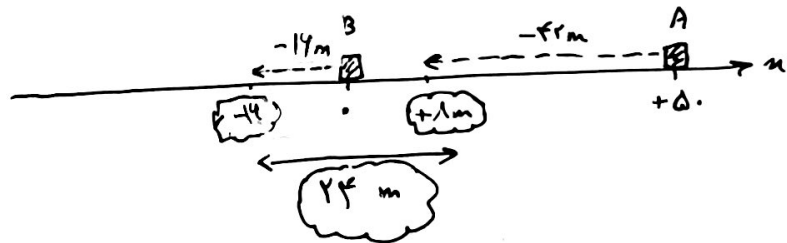
$$l = 28 + 11 = 39m \quad S_{av} = \frac{l}{\Delta t} = \frac{39}{12} = 3.25 \frac{m}{s}$$

۲ - ۲۸



$$S_1 = \Delta x_{A \rightarrow r} = \frac{(-2 + (-2 \times 4)) \times 4}{2} = -18m$$

$$S_2 = \Delta x_{B \rightarrow r} = \frac{(-4 + (-4 \times 8)) \times 8}{2} = -144m$$



۲ - ۵۰

$$l = S_{av} \times \Delta t = \frac{\Delta l}{\Delta t} \times \Delta t = \Delta l = 1m$$

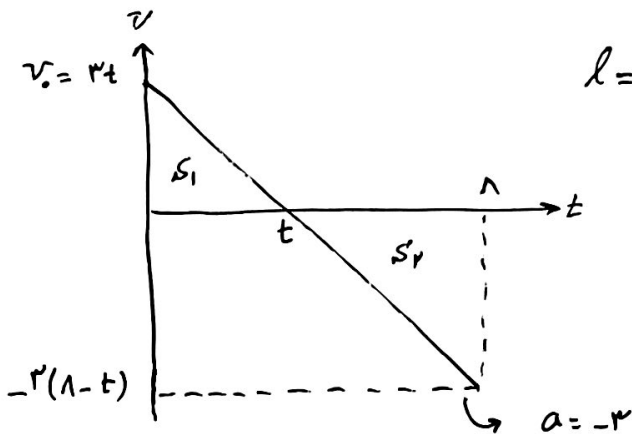
$$l = S_1 + |S_2| = \frac{r \times t}{2} + \frac{r(\lambda - t)}{2} = \Delta l$$

$$t^2 + 4t - 14t + t^2 = 24$$

$$t^2 - 10t + 18 = 0 \rightarrow \begin{cases} t = 2s \\ t = 8s \end{cases}$$

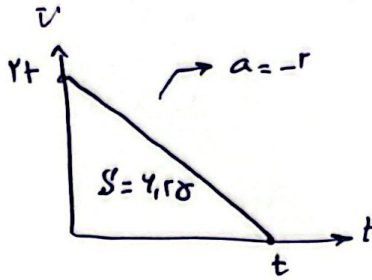
$$v_s = r \times r = 9 \frac{m}{s}$$

$$v_s = r \times 8 = 18 \frac{m}{s}$$

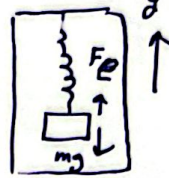
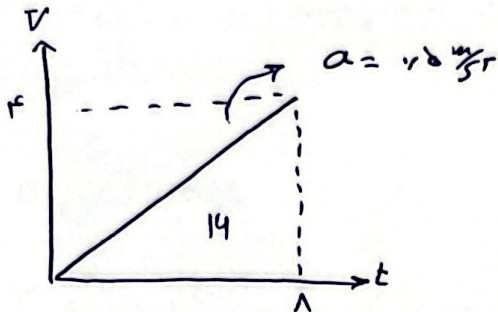


$$a = -\mu_k \cdot g = -0.2 \times 10 = -2 \text{ m/s}^2$$

$$4.128 = \frac{v^2}{r} \rightarrow t = 1.28 \text{ s}$$



۱ - ۵۱



$$k \cdot x - mg = ma$$

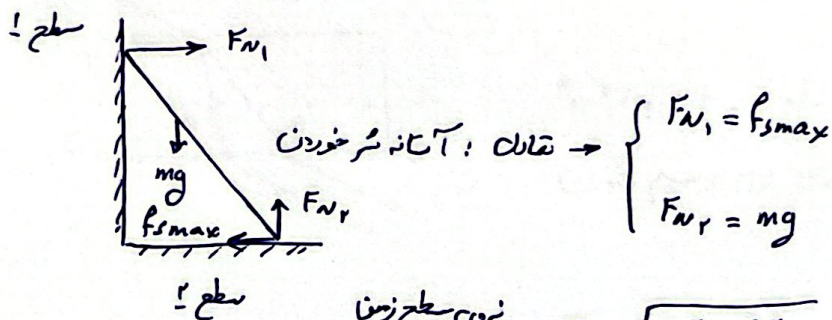
$$k \cdot x = m(g + a)$$

$$28 \cdot x = \frac{1}{r} (9.8 + 1.5)$$

$$x = \frac{1.3}{\Delta \dots} = \frac{2.04}{1.00} \text{ m} = 2.04 \text{ mm}$$

← افزایش m یا μ (کُفتی)

۴ - ۵۲



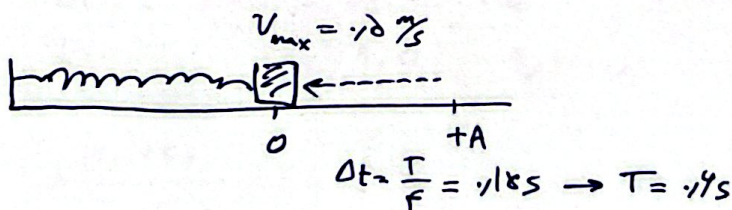
۲ - ۵۳

$$\text{قانون: آسان تر خوردن} \rightarrow \begin{cases} F_{N1} = f_{smax} \\ F_{N2} = mg \end{cases}$$

سطح ۲

$$\text{نیروی سطح زمین به فرد بان: } R = \sqrt{F_{N1}^2 + f_{smax}^2} = \sqrt{(mg)^2 + f_{smax}^2} > mg$$

$$\text{نیروی سطح دیوار به فرد بان: } R' = F_{N1}$$



$$\omega = \frac{2\pi}{T} = \frac{2\pi}{0.4} = \frac{1}{0.2} \pi \text{ Rad/s} = 5\pi \text{ Rad/s}$$

$$\omega = 1.6 \text{ Rad/s}$$

۲

$$v_m = A\omega$$

$$\frac{1}{T} = A \times 1.0 \rightarrow A = \frac{1}{T} \text{ m} = 0.2 \text{ cm}$$

$$K_{max} = E = \frac{1}{2} m \omega^2 A^2$$

$$\omega^2 = \Delta$$

$$r - 58$$

$$f \times 10^{-2} = \frac{1}{T} \times 10^{-1} \times \omega^2 \times 14 \times 10^{-2}$$

$$\alpha = -\omega^2 u = -\Delta \times \frac{u}{10} = -1.8 \frac{m}{s^2}$$

$$|\alpha| = 1.8 \frac{m}{s^2}$$

$$f = 1 \text{ Hz} \rightarrow \omega = 2\pi f = 14\pi \text{ Rad/s}$$

$$V_M = V_{max} = A\omega = 10 \times 14\pi = \frac{14\pi}{8} \frac{m}{s} \quad 1 - 57$$

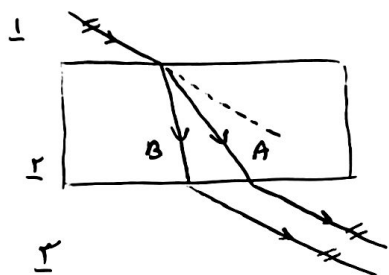
$$\beta_1 - \beta_r = 14 \text{ dB}$$

$$\beta_1 - \beta_r = 10 \log \frac{I_1}{I_r} = 10 \log \left(\frac{r_r}{r_1} \right)^2$$

$$1 - 56$$

$$14 = \log \left(\frac{r_1 + r_r}{r_1} \right)^2 \rightarrow 2 - 2(\log r_r) = \log 10 - \log r_r = \log \frac{10}{r_r} = \log 10$$

$$20 = \left(\frac{r_1 + r_r}{r_1} \right)^2 \rightarrow \delta = \frac{r_1 + r_r}{r_1} \rightarrow 2r_1 = r_r \rightarrow r_1 = 5 \text{ m}$$



$$n_B > n_A \rightarrow \text{شکست بیشتر}$$

$$2 - 58$$

$$\rightarrow \text{میدان های اول و دوم یکسان}$$

$$\rightarrow \text{برتویا موازن}$$

$$N = \frac{N_1}{r^n} \rightarrow \frac{1}{r} = \frac{1}{r^n} \quad \begin{matrix} t \rightarrow \frac{t}{r} \\ n \rightarrow \frac{n}{r} \end{matrix} \rightarrow \frac{1}{r^{\frac{n}{r}}} = \frac{1}{\sqrt{r}} = \frac{\sqrt{r}}{r}$$

$$2 - 59$$

$$F_T = F_{1r} \rightarrow F_{1r} \rightarrow F_{1r} \rightarrow F_{1r} = 2 F_{1r} \rightarrow F_{1r} = 2 F_{1r}$$

$$2 - 60$$

$$k \frac{|q_1| |q_2|}{d^2} = 2 k \frac{|q_1| |q_2|}{q d^2} \rightarrow |q_2| = \frac{2}{q} |q_1| = 2 \mu C \rightarrow q_2 = -2 \mu C$$

$$E'_1 = E'_r \rightarrow E'_1 = E'_r \rightarrow E'_1 = E'_r \rightarrow E'_1 = E'_r$$

$$2 E_r = E_1 \rightarrow 2 k \frac{1\lambda}{(r-n)^2} = k \frac{\lambda}{x^2}$$

$$2 - 61$$

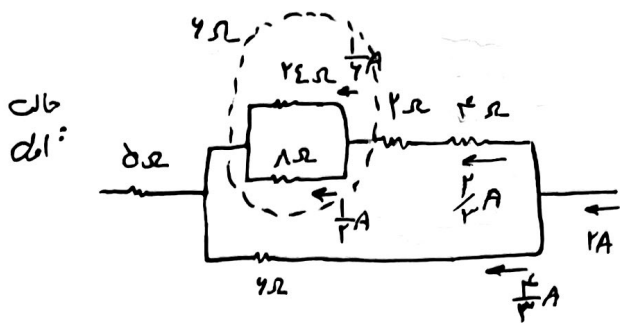
$$\frac{r}{r-n} = \frac{1}{n} \rightarrow r n = r - n \rightarrow n = \Delta \text{ cm}$$

$$E'_1 = 2 E'_r \rightarrow \frac{r}{(r+y)} = \frac{1}{y} \rightarrow r y = r + y \rightarrow y = 1.0 \text{ cm}$$

$$1.0 \text{ cm}$$

ظن
دست
بازر:

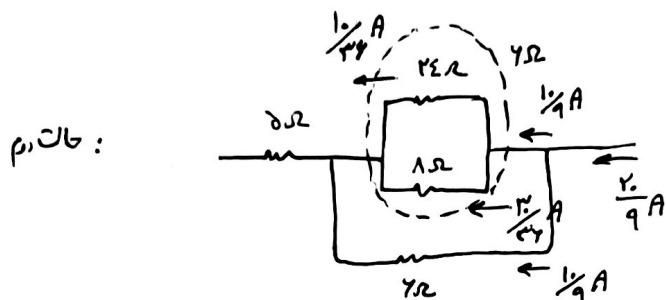
$$C = \frac{\epsilon A}{d} \rightarrow U = \frac{1}{r} C V \rightarrow \begin{cases} U = \frac{1}{r} \frac{Q}{C} = \frac{1}{r} \frac{\delta \cdot x \cdot \delta}{1} = 12 \delta n f \\ U_r = \delta U_i \rightarrow \Delta U = f U_i = \delta \cdot n f \end{cases}$$



1-43

Req = 9Ω

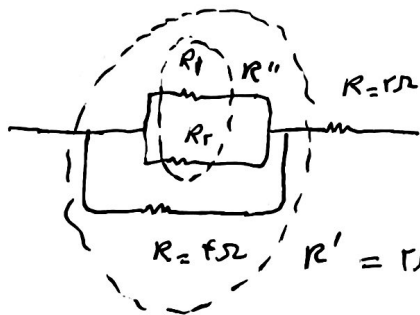
$$I = \frac{\Sigma}{R_{eq} + r} = \frac{r}{9+1} = 1A$$



$$\frac{I'}{I} = \frac{\frac{r}{9}}{\frac{1}{9}} = \frac{\delta}{r}$$

Req' = 1Ω

$$I' = \frac{\Sigma}{R'_{eq} + r} = \frac{r}{1+1} = \frac{r}{2} A$$



$R = R' = 2\Omega$

1-45

$R_1 = 4\Omega$
 $R_2 = 12\Omega$

$A = \pi \left(\frac{d}{r}\right)^2$

$R = \rho \frac{L}{A} \rightarrow \frac{r}{\delta}$
 $\downarrow$
 $A \rightarrow \frac{14}{r\delta}$
 $\frac{\frac{r}{\delta}}{\frac{14}{r\delta}} = \frac{\delta}{r}$

1-48

$\rho_A = 1/r$
 $\rho_{mix} = 1/2$
 $\rho_B = 1/1$
 $\frac{V_A}{V_B} = \frac{1/r}{1/2} = 2$

$\frac{m_A}{m_B} = \frac{\rho_A}{\rho_B} \times \frac{V_A}{V_B} = \frac{1/r}{1/1} \times 2 = \frac{r}{2}$

1-49

$$\Delta P = \rho g \Delta h \rightarrow \text{تفاوت } \Delta h \text{ و } \Delta P \text{ را به } \frac{2.5 \text{ cm}}{22 \text{ cm}} \mid \frac{7 \text{ kPa}}{? \text{ kPa}} \rightarrow \Delta P = 7.9 \text{ kPa} \quad \text{۴-۴۷}$$

$$h = V_{E, A} - V_{E, B} = 41 \text{ cm} \xrightarrow{\text{تفاوت}} 8 \text{ cm Hg} \quad \text{۱-۴۸}$$

$$R_{a_t} = R_{a_1} \times R_{a_r} = \frac{28}{100} \times \frac{4}{100} = \frac{18}{100} \rightarrow R_{a_t} \times 100\% = 18\% \quad \text{۴-۴۹}$$

$$Q = mL_F \rightarrow L_F = \frac{Q}{m} \rightarrow \frac{L_{FA}}{L_{FB}} = \frac{20}{18} \times \frac{300}{500} = 1.2 \quad \text{۲-۵۰}$$

$$\theta_e = \frac{m_1 C_1 \theta_1 + m_2 C_2 \theta_2}{m_1 C_1 + m_2 C_2} = \frac{30 \times 518V \times 10 + 12 \times 900 \times 20}{30 \times 518V + 12 \times 900} = 44^\circ \text{C} \quad \text{۳-۵۱}$$

$$\mathcal{E}_m = I_m R = 3 \times 5 = 15 \text{ V} \quad \mathcal{E} = \mathcal{E}_m \sin\left(\frac{2\pi}{T} t\right) \quad \text{۴-۵۲}$$

$$\mathcal{E} = 15 \sin\left(\frac{2\pi}{\frac{1}{2}} \times \frac{2}{4}\right) = 15 \sin\left(\frac{2\pi}{4}\right) = 15 \times \frac{1}{2} = 7.5 \text{ V}$$

$$B = \mu_0 \frac{NI}{\ell} \rightarrow N = \frac{B \ell}{\mu_0 I} = \frac{1.8 \times 10^{-2} \times \frac{1}{2}}{12 \times 10^{-7} \times 1.8} = 80 \quad \text{۱-۵۳}$$

$$\text{۳-۵۴}$$

$$\text{۲-۵۵}$$