

۴۶) $A = 2Z$

$$z \xrightarrow{A} 1(\alpha) + 1(-\beta) + 1(+\beta) + z'I$$

$$A = 2 + A' \Rightarrow A' = 2Z - 2$$

$$Z = 2 + Z' \Rightarrow Z' = Z - 2 = Z - 2$$

$$N' = Z' \Rightarrow N' - Z' = 0 \quad \underline{\text{نتیجہ ۱}}$$

۴۷) $q_h = -\delta \mu c$

$$\Delta U = -W_E \Rightarrow \Delta U = -20 \text{ J}$$

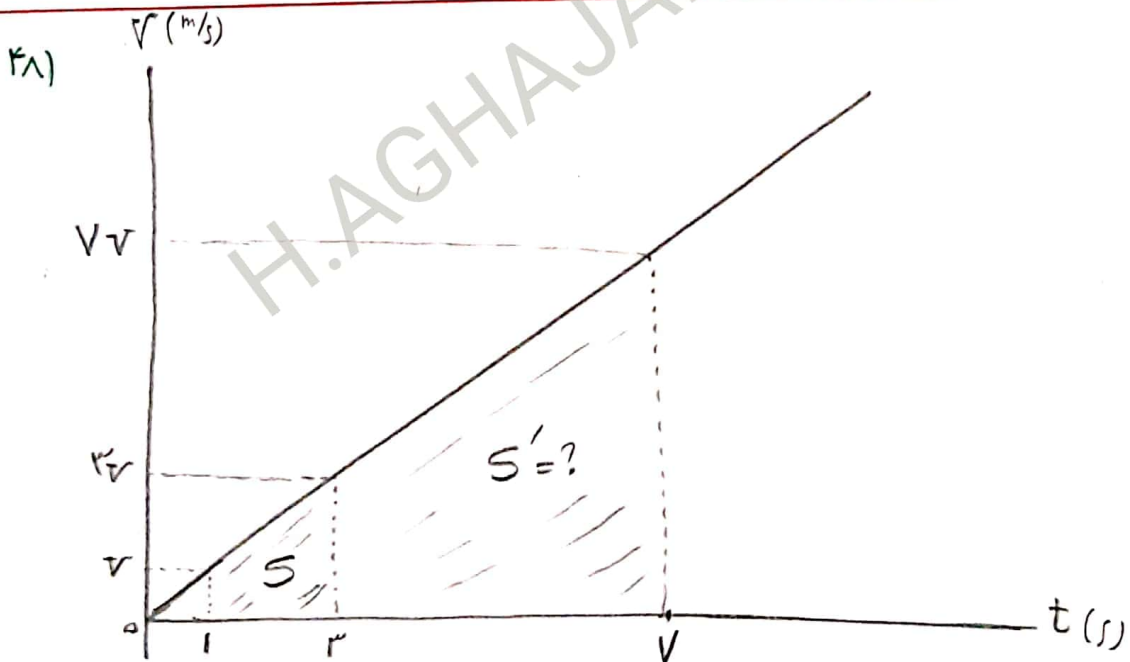
$$\frac{W}{E} = 20 \text{ J}$$

$$\Delta V = V_B - V_A = \frac{\Delta U}{q} = \frac{-20}{-8} = 2.5 \text{ V}$$

$$V_A = 7 \text{ V}$$

$$V_B = ?$$

$$V_B - 7 = 2.5 \Rightarrow V_B = 9.5 \text{ V} \quad \underline{\text{نتیجہ ۲}}$$

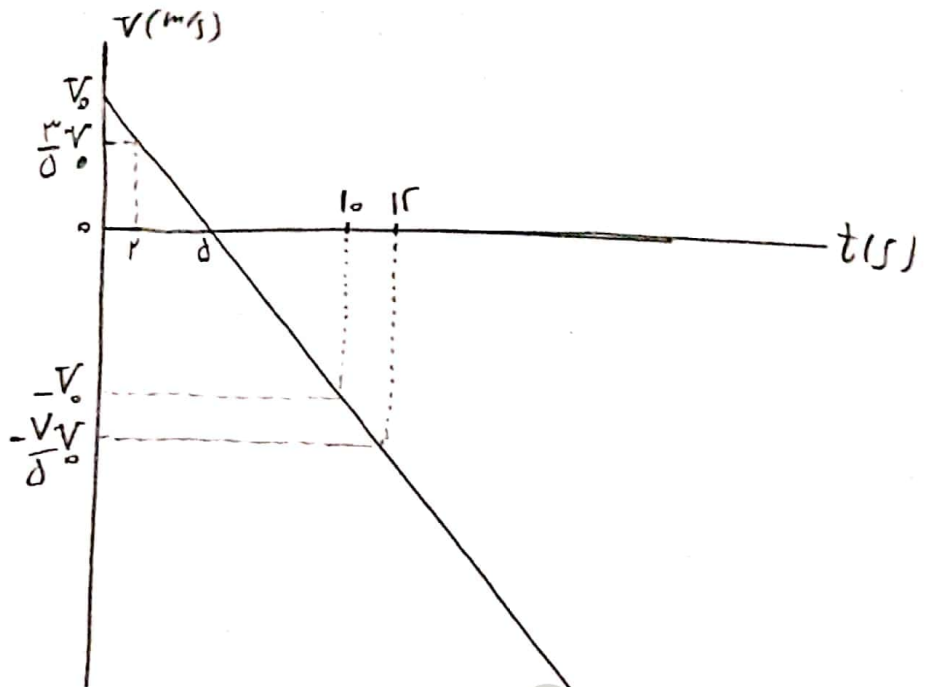


$$\frac{v + 2v}{2} \times r = 20 \Rightarrow v = 2 \text{ m/s}$$

$$S' = \frac{2v + V}{2} \times r = 10 \times 2 = 20 \text{ m} \quad \underline{\text{نتیجہ ۳}}$$

صفحة ٢

٢٩) $x_0 = 15m$
 $v_0 > 0$
 $t = \delta s \Rightarrow v = 0$
 $(1.5/0)s: S = ?$



$(0, 1.5)s: \Delta x = -15m$

$(0, 1.5)s: \Delta x = \int_{(v-t)} = v_0 \delta + (-0.9 v_0) = -0.1 v_0 \delta$ } $v_0 = 1.0 m/s$

$(1.5/0)s: L = \frac{v_0 \times \delta}{r} + \left| \frac{\delta \times (-v_0)}{r} \right| = 0.9 v_0 + 0.1 v_0 = v_0 \delta = 15m$

$S_{av} = \frac{L}{\Delta t} = \frac{15}{1} = 15 m/s$ ١ ←

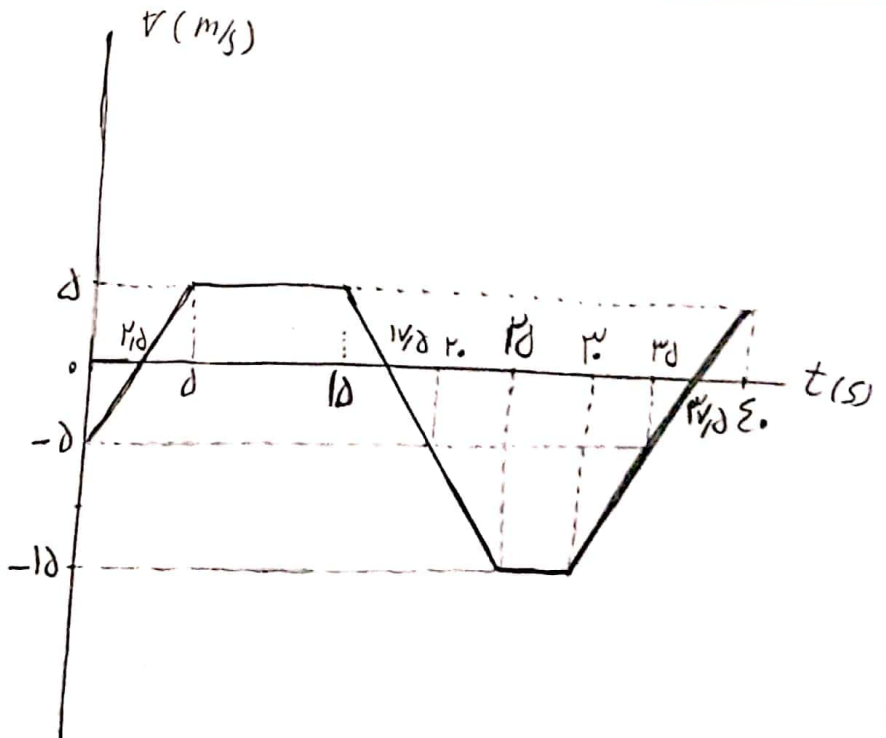
٥٠) $v_0 = -10 m/s$

- ① عند
- ② عند

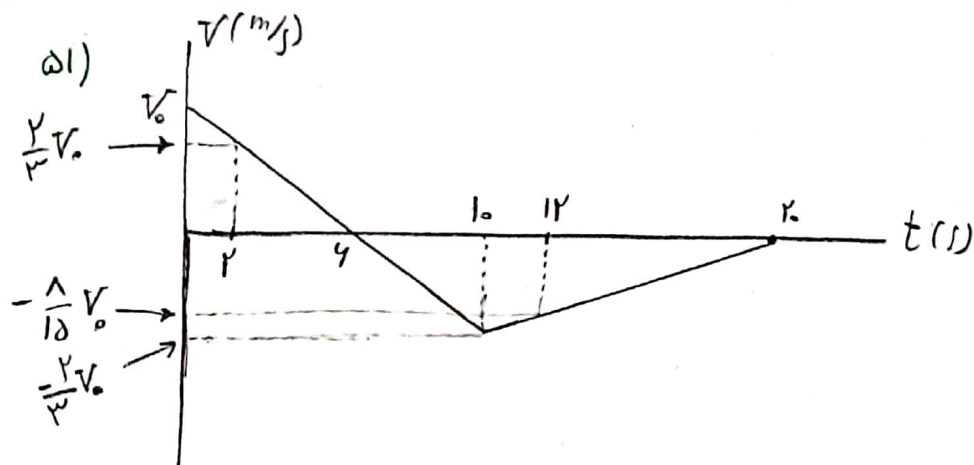
$\Delta x = -110m$

- ③ عند

$15 \leftarrow$



صفی ۳



$$|S_1| + |S_2| = v_0 \times 4 + \frac{1}{2} \times \frac{1}{10} v_0 \times (14 - 4) = \frac{23}{5} v_0 \quad 12 \times = \frac{23}{5} v_0 \Rightarrow v_0 = \frac{2 \times 12 \times 1}{23} \text{ m/s}$$

(۲, ۱۲) s: $a_{av} = \frac{\Delta v}{\Delta t} = \frac{(-\frac{1}{10} - \frac{2}{5}) v_0}{10} = -\frac{3}{20} v_0 = -\frac{3}{20} \times \frac{2 \times 12 \times 1}{23} = -1.19$

$$|a_{av}| = 1.19 \text{ m/s}^2 \quad \underline{\text{نزخ ۱}}$$

۵۲) $k \times 10 \text{ cm} = mg$

$$\frac{F}{k} = \rho_k \times F_N = 1/2 Mg$$

$$k \times 2 \text{ cm} = 1/2 Mg$$

$$\Rightarrow \frac{M}{m} = 1$$

$$\underline{\text{نزخ ۳}}$$

۵۳)

$$P = 2(t-1)(t-2)$$

$$t_1 = 1 \text{ s} \Rightarrow P_1 = -2$$

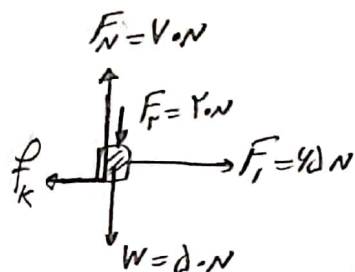
$$t_2 = 3 \text{ s} \Rightarrow P_2 = 4$$

$$F_{av} = \frac{\Delta P}{\Delta t} = \frac{4 - (-2)}{2} = 3 \text{ N}$$

$$\underline{\text{نزخ ۲}}$$

صفحة 4

54)



$a = \text{con.}$

$$a = \frac{v - v_0}{\Delta t} = \frac{15 \times 10 - 0}{3 \times 10} = 4 \text{ m/s}^2$$

$$a = \frac{F_{\text{net}}}{m} \Rightarrow 4 = \frac{40 - f_k}{d}$$

$$f_k = 10 \text{ N}$$

$$P_R = \sqrt{F_N^2 + f_k^2} = \sqrt{v_0^2 + kv_0^2} = kv_0 \sqrt{d} \text{ N}$$

55) $T = \frac{\Delta t}{N} = \frac{1.45}{1} = 1.18 \text{ s}$

$$T = 2\pi \sqrt{\frac{L}{g}} \Rightarrow 1.18 = 2\pi \sqrt{\frac{L}{\pi r}}$$

$L' - L = -17 \text{ cm}$

$L = 1.11 \text{ m} = 111 \text{ cm}$

$\Delta t' = 0.5 \Rightarrow N' = ?$

$L' - 111 = -17 \Rightarrow L' = 94 \text{ cm}$

$$T' = 2\pi \sqrt{\frac{L'}{g}} = 2\pi \sqrt{\frac{0.94}{\pi r}} = 1.145$$

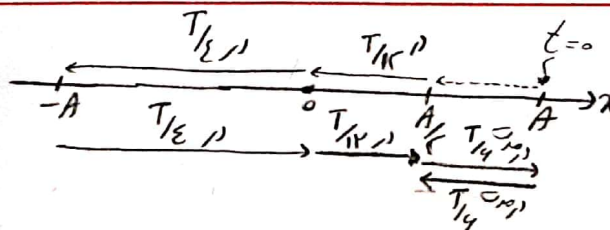
$$1.14 = \frac{0.5}{N'} \Rightarrow N' = 28$$

النتيجة

56) $v = \frac{r}{D} \sqrt{\frac{F}{\pi f}} = \frac{r}{r \times 10^{-3}} \times \sqrt{\frac{2 \times 10}{\pi \times 10 \times 10^{-2}}} = 1.0 \text{ m/s}$

$\frac{\lambda}{r} = ? = \frac{v}{r f} = \frac{1.0}{r \times 10} = \frac{1}{r} \text{ m} = 20 \text{ cm}$

57) $A = 10 \text{ cm} = 10^{-2} \text{ m}$
 $\lambda = 10 \text{ cm} = \frac{A}{r}$



$\Delta t_{\text{min}} = 2 \times \frac{T}{4} = \frac{T}{2}$

$T = \frac{2\pi}{v \times 10} = 4 \text{ s}$

$\Delta t_{\text{min}} = 2 \text{ s}$

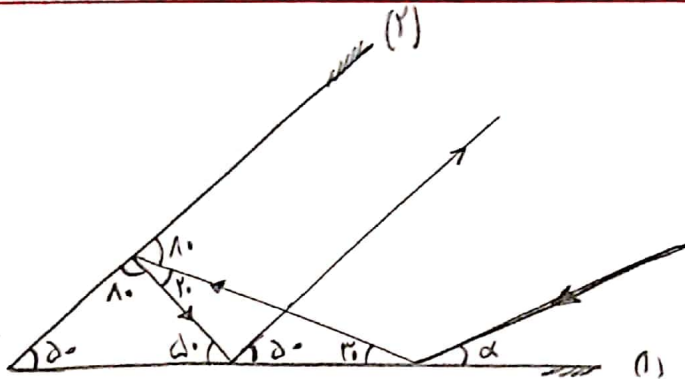
صفحة 5

51) $d_1 + d_2 = 10 \mu m$

$$\left. \begin{aligned} \frac{v d_1}{v_s} = \frac{v_s}{v} \Rightarrow d_1 = \frac{v_s^2}{v} \\ \frac{v d_2}{v_s} = \frac{v_s}{v} \Rightarrow d_2 = \frac{v_s^2}{v} \end{aligned} \right\} d_1 = d_2 = 5 \mu m$$

نتیجه 1

59)



$\Rightarrow \alpha = 30^\circ$

نتیجه 1

90) نتیجه 1

91) $h = \Delta$

$\Delta h = 1$

$$h f_{min} = E_D - E_E \Rightarrow \frac{h c}{\lambda_{max}} = \frac{q E_R}{20 \times 10^9} \Rightarrow \lambda_{max} = \frac{20 \times 10^9 h c}{q E_R}$$

$$h f_{max} = E_F - E_I \Rightarrow \frac{h c}{\lambda_{min}} = \frac{v}{r} E_R \Rightarrow \lambda_{min} = \frac{r h c}{v E_R}$$

$$\lambda_{max} - \lambda_{min} = \frac{r}{v} \frac{h c}{E_R} \left(\frac{qV}{r} \right) = \frac{r}{v} \times \frac{125 \cdot eV \cdot nm}{12,9 eV} \times \frac{qV}{r} \approx 2921 \text{ nm}$$

نتیجه 3

92) $C = \epsilon_0 \mu F$

$q' = \frac{v}{r} q$

$U' - U = 20 \mu J$

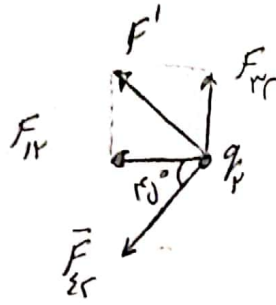
$q = ? \mu C$

$$\frac{1}{r C} (q'^2 - q^2) = 20 \mu J \Rightarrow \frac{1}{r C} \left(\frac{v}{r} q^2 \right) = 20 \mu J$$

$$\frac{1}{r \epsilon_0} \times \frac{v}{\epsilon} q^2 = 20 \Rightarrow q^2 = 14 \dots \Rightarrow q = 3.74 \mu C$$

نتیجه 1

43)



$$\vec{F}_{het} = -1A \vec{i}$$

$$F'_c = \frac{9.0 \times 0.0 \times r}{1.0} = 9N$$

$$F' = 9\sqrt{2}N$$

$$F'_c + F'_{\Sigma c} = 1A \rightarrow F'_{\Sigma c} = 9\sqrt{2}N$$

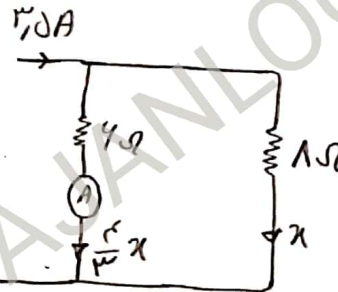
$$\frac{9.0 \times |q_{\Sigma}| \times r}{(1.0\sqrt{r})^r} = 9\sqrt{r}$$

$$q_{\Sigma} = -1.0\sqrt{r} \mu c \quad \underline{\text{نیز}}$$

44) در حالت اول:

$$R_{eq} = r + \frac{r_2}{V} = \frac{24}{V} \Omega$$

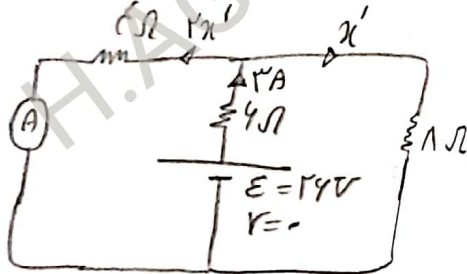
$$I = \frac{24}{\frac{24}{V} + 0} = 1.5A$$



$$\frac{V}{r} x = \frac{V}{r} A$$

$$x = 1.5A$$

در حالت دوم:



$$\Rightarrow R_{eq} = 4 + \frac{1}{3} = \frac{14}{3} \Omega$$

$$I = \frac{24}{\frac{14}{3} + 0} = 3A$$

$$3x' = 3A \Rightarrow x' = 1A$$

$$|x' - x| = 1.5A \quad \underline{\text{نیز}}$$

$$45) I = \frac{2r}{R_{eq} + r}$$

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

$$R_{eq} \cdot I = \frac{14}{3} \times R'_{eq} \times I'$$

$$\left(\frac{I'}{I}\right)^r = \frac{R}{R'} \times \frac{18}{14}$$

$$P = \begin{cases} \epsilon I - r I^2 \\ R_{eq} \cdot I^2 \end{cases}$$

$$\left(\frac{R+r}{R'+r}\right)^r = \frac{R}{R'} \times \frac{18}{14} \Rightarrow \frac{R+r}{R'+r} = \sqrt{\frac{R}{R'} \times \frac{18}{14}}$$

$$P = 0.42 P'$$

نیز با جانمایی نیز

صفحة ٧

٤٤) عدد الجسيمات $I = \frac{12}{4} = 3A$ ، عدد الجسيمات $= 1.7$

عدد الجسيمات $I = 0$ ، عدد الجسيمات $= 5 = 1.7$

١.٧ \Rightarrow حالة اول / اختلاف الجسيمات (أول مرة)

صفر \Rightarrow حالة دوم

النتيجة ١

٤٧) $\vec{E} = -N \frac{\Delta\phi}{\Delta t} = -N \times A \times \cos\theta \times \frac{\Delta B}{\Delta t}$

$\vec{E} = -10^2 \times 5 \times 10^{-3} \times \cos 50^\circ \times \frac{0 - 2 \times 10^{-2}}{1-1} = 0.1 V$ النتيجة ٢

٤٨) النتيجة ٣

٤٩) $P = P_0 + \frac{m_1 g}{A} + \frac{m_2 g}{A}$

$= 1.01 \times 10^5 + \frac{2 \times 10^{-2} \times 10^{-2}}{2 \times 10^{-2}} + \frac{5 \times 10^{-2} \times 10^{-2}}{2 \times 10^{-2}}$

$= 1.01 \times 10^5 + 10^2 + 2.5 \times 10^2 = 1.0375 \times 10^5 = 1.0375 \times 10^5 Pa$

النتيجة ٣

٥٠) $\Delta k = W_T \Rightarrow k - k_0 = W_{mg} + W_F$

$\Rightarrow \frac{1}{2} m (v^2 - v_0^2) = mgh + W_F \Rightarrow \frac{1}{2} \times 2 \times 10^{-1} (10^2 - 10^2) = 3 + W_F$

$\Rightarrow W_F = -7.4 J$ النتيجة ٤

صفحہ ۱

VI)

$$\theta_c = \frac{m_1 \cdot c_1 \cdot \theta_1 + m_2 \cdot c_2 \cdot \theta_2 + C_p \cdot \theta_c}{m_1 \cdot c_1 + m_2 \cdot c_2 + C_p}$$

$$Y_o = \frac{0.2 \times 472 \times 10 + 1.0 \times 472 \times 10 + C_p \times 9.0}{0.2 \times 472 + 1.0 \times 472 + C_p}$$

$$C_p = 243 \text{ J/K} \quad \underline{\underline{۲}} \text{ نرنج}$$

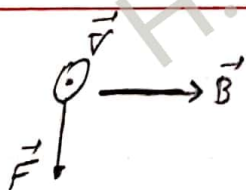
$$v_2) \quad k = \frac{1}{T} m v^2 = \frac{1}{2} \times 2 \times 10^{-3} \times (20 \times 10^2)^2 = 400 \times 10^4 \text{ J} = 4 \times 10^6 \text{ MJ} \quad \underline{\underline{۲}} \text{ نرنج}$$

$$v_3) \quad F = \Delta \theta \quad T = \theta + 2v_c$$

$$\frac{q}{\delta} \theta + 2v_c = \Delta \theta \Rightarrow \theta = 10^\circ \text{C} \quad T = 213 \text{ K} \quad \underline{\underline{۳}} \text{ نرنج}$$

$$v_4) \quad q = 140 \times 10^{-14} \text{ C} = 1.4 \times 10^{-12} \text{ C} \quad \underline{\underline{۴}} \text{ نرنج}$$

v5)
q = -e



$$F_{\max} = |q| \cdot v \cdot B$$

$$1.4 \times 10^{-12} = 1.4 \times 10^{-19} \times 10 \times B$$

$$B = 0.1 \text{ T} \quad \underline{\underline{۱}} \text{ نرنج}$$