

دکتر علیزاده - مدرس فیزیک کلاسیک - سطح مقدماتی، فصل ۴، ۴.۵

(۴۱) نرینه ۲

$$Z = ne \rightarrow n = \frac{1,466 \times 10^{-17}}{1,2 \times 10^{-19}} = 12$$

(۴۲) نرینه ۴

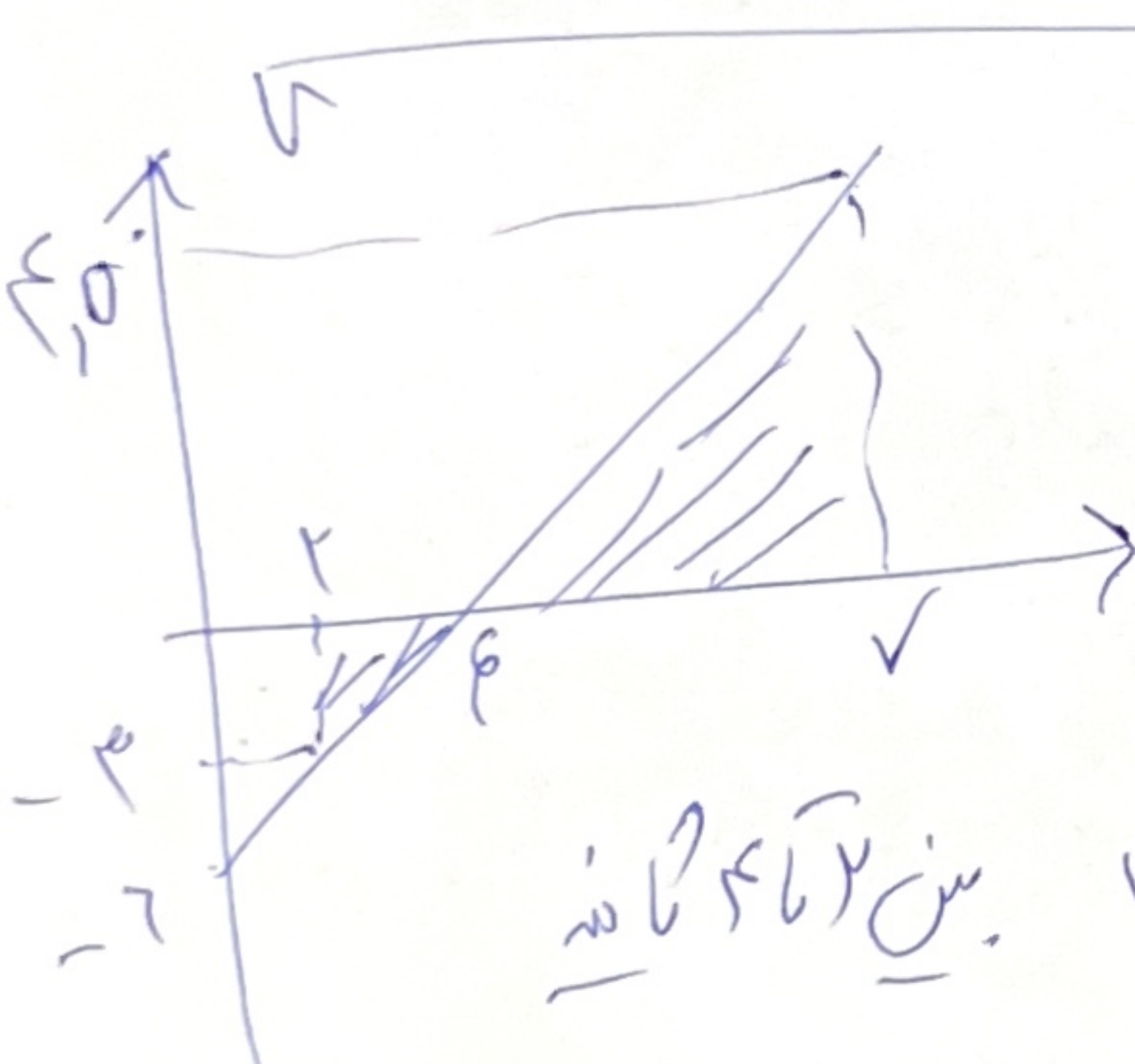
$${}_{12}^{211}\text{X} \rightarrow {}_2^4\alpha + {}_{10}^{207}\text{Y} \rightarrow N = 2 \cdot 2 - 12 = 120$$

(۴۳) نرینه ۲

(۴۴) نرینه ۳

(۴۵) نرینه ۱

(۴۶) نرینه ۲



$$\bar{v} = \frac{\Delta x}{\Delta t} = 1,70 \rightarrow \Delta x = 3,40$$

$$\Delta x = \frac{1}{2} a t^2 + v_0 t$$

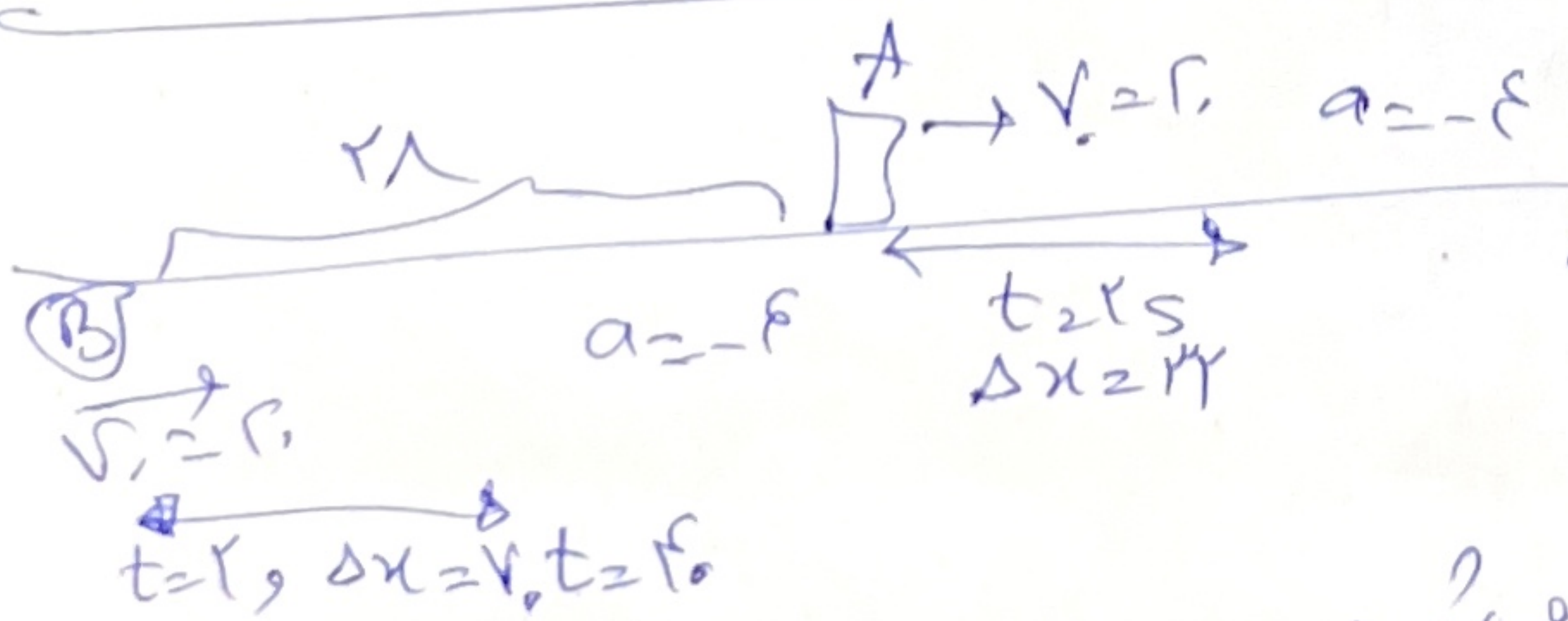
سین ۲.۱.۱۰ → ۳,۷۵ = $\frac{1}{2} a \times 0^2 + 0 \cdot v_0$ *

سین ۲.۱.۱۰ $v = at + v_0 \rightarrow 0 = 2a + v_0 \rightarrow v_0 = -2a$ **

*** $v_0 = -2, a = 1,0 \rightarrow \frac{v_0}{-a} = 2 + \frac{3 \times 4,0}{2} = 8,00$

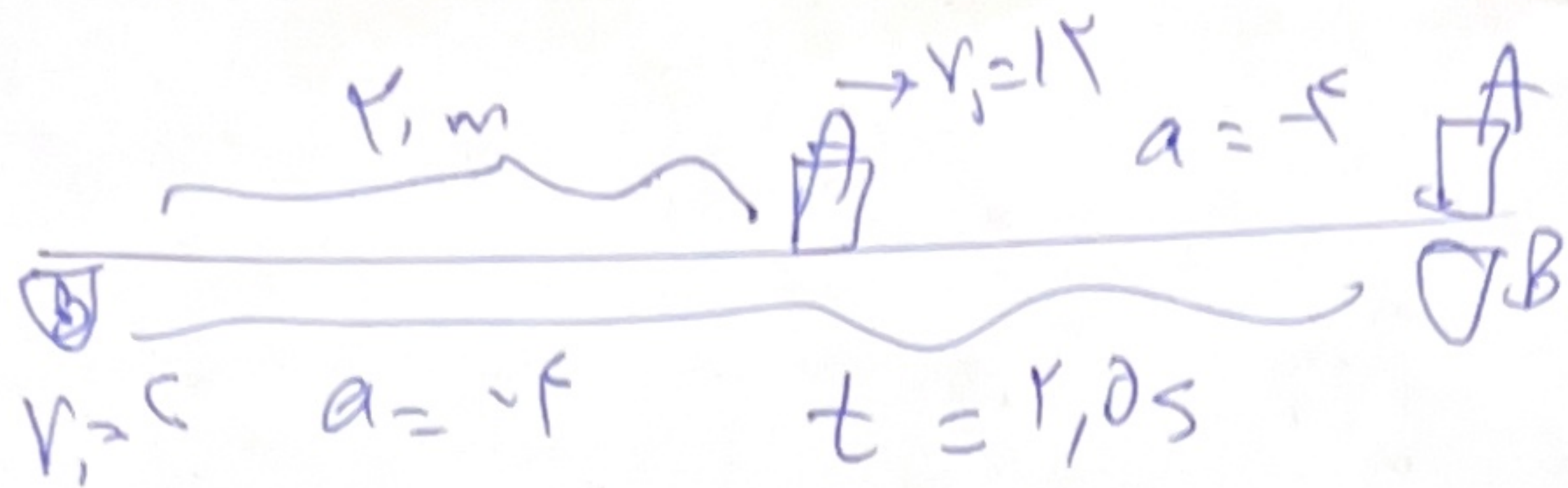
$$\bar{v} = \frac{d}{\Delta t} = \frac{4,00}{\Delta t} = 1,40$$

(۴۷) نرینه ۴



سین ۲.۱.۱۰ $\Delta x = \frac{1}{2} a t^2 + v_0 t$
 $\Delta x = 3,2$

در یک ثانیه اول از جسم ۲.۱.۱۰



$$v = at + v_0$$

$$= -5 \times 2 + 12 = 2$$

$$x_B = x_A \rightarrow -\frac{1}{2}at^2 + v_i t = -\frac{1}{2}at^2 + 12t + 2 \rightarrow t = 2.0$$

$$v = at + v_i = -5 \times 2.0 + 12 = 2$$

$$x = \frac{1}{2}at^2 + v_i t + x_0$$

$$t = 1 \rightarrow x = 9 \rightarrow 9 = \frac{1}{2} \times 2 \times 1^2 - 12 \times 1 + x_0 \rightarrow x_0 = 20$$

$$\Delta x \leq 2 \rightarrow t^2 - 12t + 20 + 2t \leq 2 \rightarrow t = \begin{cases} 2 \\ 10 \end{cases}$$

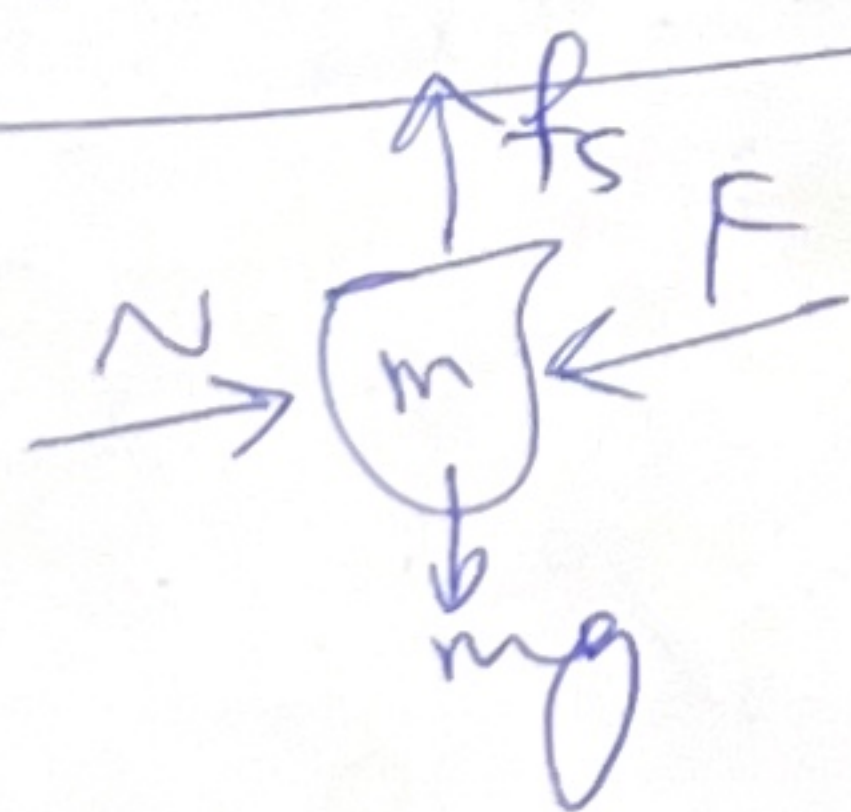
$$\Delta y = \frac{1}{2}gt^2 (n-1) + v_i t$$

$$\Delta y_1 = \frac{1}{2}g \times 2^2 (2 \times 2 - 1) = \frac{2v}{2}g$$

$$\frac{\Delta y_1}{\Delta y_c} = \frac{2v}{40}$$

$$\Delta y_c = \frac{1}{2}g \times 2^2 (2 \times 2 - 1) = 10g$$

$$\frac{T}{T'} = \frac{12h}{1min} = \frac{12 \times 20min}{1min} = 240$$



$$T_s = mg$$

$$T = mg + ma \rightarrow \dots$$

$$v^2 - v_i^2 = 2a\Delta x \rightarrow -12^2 = 2 \times (-5) \times \Delta x \rightarrow \Delta x = 14.4$$

$$f_k = ma = 5 \times 1 = 5$$

$$N = mg = 10 \times 1 = 10$$

$$R = \sqrt{f_k^2 + N^2} = \sqrt{5^2 + 10^2} = 11.18$$

$$\beta_r - \beta_1 = \gamma \log \frac{v_1}{v_r} = \gamma \log \frac{\lambda_r}{\lambda_1} = -\gamma$$

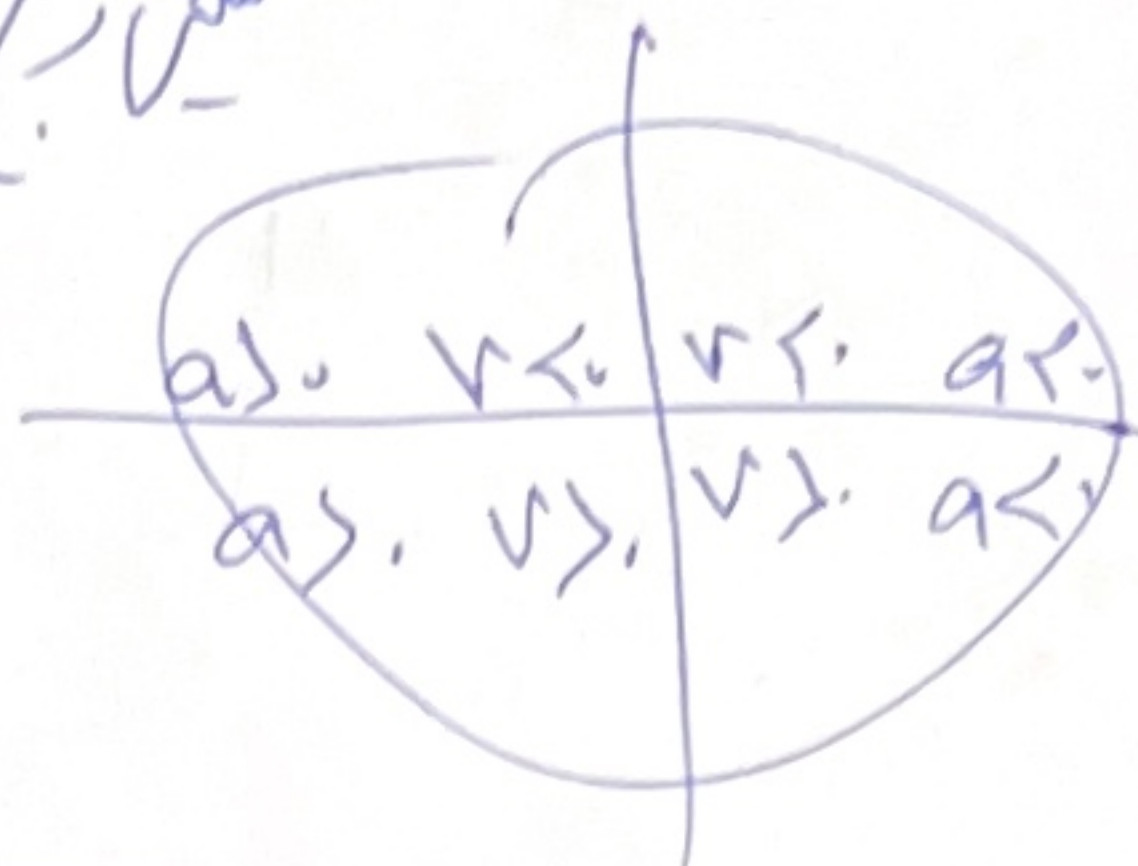
نکته ۵۴

$$\beta_r - \gamma = -\gamma \rightarrow \beta_r = 0$$

$$\omega = \frac{v}{\lambda} = 0 \rightarrow T = \frac{v}{0}$$

نکته ۵۵

$$\frac{1}{f} = \frac{v}{\omega \times r} = n m s$$



$$f = \frac{vr}{\lambda^2} \rightarrow \gamma = \frac{r \times v}{\lambda^2} \rightarrow v = \gamma$$

نکته ۵۶

$$v = \sqrt{\frac{F}{\rho A}} \rightarrow \rho_A \lambda = \frac{\rho_A \lambda^2}{\partial x \lambda^2 A} \rightarrow A = 1, 0 (mm)^2$$

نکته ۵۷

$$\frac{1}{2} m v^2 = \frac{hc}{\lambda} - \phi$$

$$\frac{1}{2} m v^2 = \frac{1}{2} \times 9 \times 10^{-31} \times (1 \times 10^6)^2 = \frac{9 \times 10^{-17} \times 10^{-19}}{2 \times 1, 7 \times 10^{-19}} = 1, 1 eV$$

$$1, 1 eV = \frac{1240}{\lambda} - 2, 2 \rightarrow \lambda = 1, 0 nm$$

نکته ۵۸

$$E_a - E_r = -E_R \left(\frac{1}{r} - \frac{1}{r_0} \right) = 1, 2 E_R$$

$$= 1, 21 \times 10^2 = 1, 10^2$$

$$\Delta E = \frac{hc}{\lambda} \rightarrow 1, 10^2 = \frac{1240}{\lambda}$$

$$\rightarrow \lambda = 1, 1 nm$$

نکته ۵۹

$$F_{12} = F_{21} = \frac{k q_1 q_2}{a^2} \rightarrow F_{tr} = \sqrt{2} \frac{k q_1 q_2}{a^2}$$

$$F_{12} = \frac{k q_1 q_2}{(\sqrt{2} a)^2} = \frac{1}{2} \frac{k q_1 q_2}{a^2} \rightarrow \frac{F_{tr}}{F_{12}} = \sqrt{2}$$

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$$u = \frac{1}{r} q r \rightarrow q_1 = \epsilon q r$$

$$R = \frac{R_1}{n} = \frac{1}{n} \frac{\rho L}{A}$$

$$\gamma R = \frac{\rho L}{A'} = \gamma \times \frac{1}{\gamma} \frac{\rho L}{A} \rightarrow A' = \epsilon A \rightarrow d' = \epsilon d$$

$$R = R_0 (1 + \alpha \Delta \theta)$$

$$\begin{aligned} T &= \theta + r v^0 = r_\perp v_\perp + r v^0 \\ T_\perp &= \partial \lambda. \end{aligned}$$

$$R = \gamma_0 \left(1 + \gamma_1 \frac{1}{\gamma_0} \times (0.10 - \gamma_{0.0}) \right) = \gamma_4$$

$$I = \frac{V}{R} = \frac{\gamma \mu E}{\mu A} = 7$$

(۶۳) $I = \frac{V}{R} = 2A$ ۳
 نیز که $R_1 = R_2 = R_3 = R_4 = 1 \Omega$ و $\epsilon = 1.0$ به صورت
 و ولت به R_2 و R_4 اتصال کوتاه. ولت $V_3 = 1$ ولت و ولت V_1 و V_2 را
 کل اقلای بی V_1 و V_2 ۴

(۶۴) لہذا قانون دست راست ← ذہن بائیں دست

$$\tau F = ma \rightarrow qvB = \frac{mvr}{r} \rightarrow m = \frac{qBr}{v}$$

$$m = \frac{1,2 \times 10^{-19} \times 1,0 \times 10^{-6} \times 10 \times 10^{-7}}{1,2 \times 10^{-19}} = 1,0 \times 10^{-14} \text{ kg}$$

(65) لرنیہ

(66) لرنیہ

(67) لرنیہ

$$\bar{\epsilon} = -N A \frac{\Delta B}{\Delta t} = -1 \times 10^6 \times \frac{10^{-2}}{1} \times \frac{1 \times 10^{-2}}{10^{-2}} = 7.28$$

$$A = \pi \frac{d^2}{4}$$

(68) لرنیہ

لرنیہ

$$\rho = \frac{m}{V} \rightarrow \frac{1.8}{1} \quad \frac{1.4}{17.8} \quad \frac{1.2}{11.8} \quad \frac{1.2}{12.33}$$

✓

(69) لرنیہ

(70) لرنیہ

$$P_1 V_1 = P_2 V_2 \rightarrow P_1 h_1 = P_2 h_2$$

$$P_{1, \text{gas}} - P_0 = \rho_{\text{air}} g \rightarrow P_1 - P_2 = \rho \rightarrow P_1 = P_2 + \rho h$$

$$h_1 = \rho h_2 \quad h_2 = \rho h_1 \rightarrow \rho h_1 \times \rho h_2 = \rho \times \rho h_2$$

$$\rightarrow P_2 = 91 \text{ cm Hg} \rightarrow P_2 = h' + P_0 \Rightarrow 91 - V_2 = h' = 10 \text{ cm}$$

$$h'' = 10 + 12 - 12 = 10 - 12 = 19 \text{ cm}$$

$$V = A h'' = 2 \times 19 = 38 \text{ cm}^3$$

✓

$$mgR = k_B + mgR(1 - \cos 70^\circ) = k_B + \frac{1}{2}mgR \quad \text{نیز (V1)}$$

$$\rightarrow k_B - k_A = \frac{1}{2}mgR$$

$$\frac{1}{2}mgR + k_B = k_C \rightarrow k_C - k_B = \frac{1}{2}mgR \rightarrow \frac{\Delta k_i}{\Delta k_C} = 1$$

$$\rho = \frac{\frac{F_0}{1.0} mgh}{t} = \frac{\frac{F_0}{1.0} \rho r gh}{t}$$

$$70 \times 10 = \frac{10 \times 10 \times 1 \times 5 \times 1 \times 90}{70} \rightarrow V = 10 \text{ m}^3$$

$$\Delta U_1 = \Delta U_f \rightarrow W_1 + \Delta Q_1 = W_f + \Delta Q_f \quad \text{نیز (V2)}$$

$$\Delta Q_1 < \Delta Q_f \quad \text{چون } W_1 > W_f \quad \Delta Q_c - \Delta Q_1 = W_1 - W_f = 200 \text{ J} \quad \text{نیز (V3)}$$

$$\Delta U = 0 \rightarrow \Delta U_{AB} + \Delta U_{BC} + \Delta U_{CA} = 0$$

$$\begin{aligned} W_1 &= 200 \text{ J} & \Delta Q_1 &= 100 \text{ J} & \Delta U_{CA} &= 0 & W_2 &= 200 \text{ J} + 0 - 100 \text{ J} = 100 \text{ J} \\ \Delta Q &= 0 & W &= 200 \text{ J} & \Delta Q &= -200 \text{ J} \end{aligned}$$

$$P_{\text{total}} = P_{\text{air}} + P_{\text{water}} = P + 1 = 1 \text{ atm} \quad \frac{PV}{T} = nR \quad \text{نیز (V4)}$$

$$\rightarrow \frac{(1 \times 10^5 \times 17 \times 10^{-3})}{(273 + 0.5) \times 1} = n = 1$$

$$\frac{m_N}{m_H} = \frac{18}{2} = 9$$