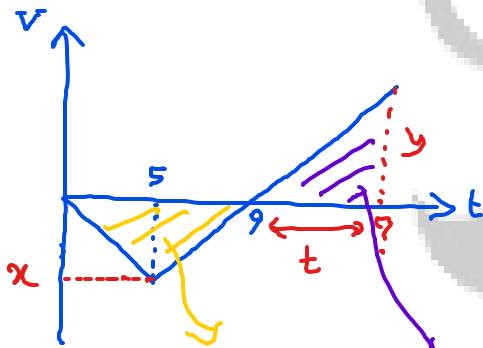


- 157

تساوی $\Delta x_{(2-3)} = 0 \Rightarrow t = 2.5$: آنی

$$L_{(2-4)} = \left| \Delta x_{(2-2.5)} \right| + \left| \Delta x_{(2.5-4)} \right| = \frac{10a}{8} = 5m$$

$$\frac{a}{8} + \frac{a}{8} + \frac{3a}{8} + \frac{5a}{8} = \frac{9a}{8}$$



$(9-5) \rightarrow x \uparrow$
 $t \rightarrow y \uparrow$
 $y = \frac{tx}{4}$

- 158 برای بین کردن x .

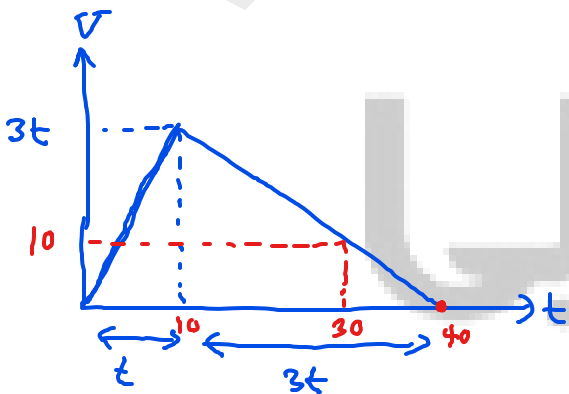
$\left| \Delta x_{(0-9)} \right| = \left| \Delta x_{(9-?) } \right|$ با $\frac{1}{2}$
 با $\frac{1}{2}$

$$\frac{9x}{2} = \frac{t \times \frac{tx}{4}}{2} \Rightarrow t = 6 \Rightarrow ? = 15s$$

- 159

طبق کمال $\Delta x_{(4-12)_A} = \Delta x_{(4-12)_B} \Rightarrow \overline{v}_A = \overline{v}_B$

α : ثابت $\Rightarrow \overline{v}_{(4-12)} = v\left(\frac{4+12}{2}\right) = v(8)$



$\Delta x_T = \frac{3t \times 4t}{2} = 600 \Rightarrow t = 10$

$\Delta x_{(0-30)} = \Delta x_T - \Delta x_{(30-40)} = 550$
 $\frac{10 \times 10}{2}$

- 161

$$K_F = \frac{1}{2} m v_F^2 \xrightarrow[m=0.1]{k=24.2} v_F = 22 \text{ m/s}$$

از آن جا که حرکت و برابر 9
 حرکت به قبل $v = 22 - 10 = 12 \text{ m/s}$

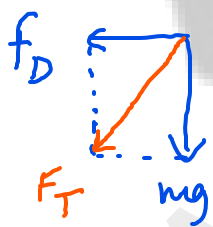
ا $\rightarrow a = \text{ت} \Rightarrow \bar{v} = \frac{22+12}{2} = 17 \text{ m/s}$

(1) $m(g+a) = k \Delta l \Rightarrow k = 200 \text{ N/m}$

- 162

(2) $\frac{210}{k} - \frac{6}{100} = \frac{m_k \times 20}{4} \Rightarrow \mu_k = 0.4$

- 163



$$F_T = \sqrt{f_D^2 + 48^2} = ma = 0.48 \times \frac{65}{6}$$

$\rightarrow f_D = 2 \text{ N}$

$T = m(g+a) = 24 \text{ N} \rightarrow T' = 48 = \frac{2}{m}(g+a')$ - 164

$\rightarrow a' = 14 = 7a$

$$k = \frac{1}{2} \frac{p^2}{m} \xrightarrow{\frac{A}{B}} \frac{\left(\frac{4}{3}\right)^2}{\frac{8}{5}} = \left(\frac{10}{9}\right) \quad -165$$

$$\vec{F}_c = \vec{R} - \vec{N} = \sqrt{R^2 - (mg)^2} = \sqrt{10^9 - 9 \times 10^8} = \sqrt{10^8} = 10^4$$

$F_{ac} = \frac{mv^2}{R}$

$$E = \frac{1}{2} k A^2 \xrightarrow{\substack{k=500 \text{ N/m} \\ A=0.04 \text{ m}}} E = 0.4 \text{ J} \quad -167$$

$$k = E - U = 0.2 \Rightarrow k = \frac{1}{2} m v^2 \Rightarrow v = 20\sqrt{10} \text{ cm/s}$$

$$\frac{T_2}{T_1} = \sqrt{\frac{m_2}{m_1}} \Rightarrow \frac{0.09\pi}{0.17\pi} = \sqrt{\frac{m_2}{m_1}} \Rightarrow \frac{m_2}{m_1} = 0.81 \rightarrow m_2 - m_1 = -190 \text{ g} \quad -168$$

$$m_1 = 1 \text{ kg} \rightarrow T_1 = 2R \sqrt{\frac{m_1}{k}} \Rightarrow k = 400 \text{ N/m}$$

4 N/cm

$\div 100$

$$T_1 = \frac{72}{40} = 1.8 \text{ S} = 2\pi \sqrt{\frac{L_1}{10}} \Rightarrow L_1 = 81 \text{ cm}$$

$$T_2 = \frac{72}{45} = 1.6 \text{ S} = 2\pi \sqrt{\frac{L_2}{10}} \Rightarrow L_2 = 64 \text{ cm}$$

- 169

17 cm گامش

$$\beta_1 - \beta_2 = 10 \log \left(\frac{I_1}{I_2} \right) \left(\frac{d_2}{d_1} \right)^2 \Rightarrow 1.8 = \log \left(\frac{d_2}{d_1} \right)^2$$

$$\Rightarrow \frac{d_2}{d_1} = \sqrt{2^6} = 8$$

170

$$\lambda = \frac{2}{3} \times 120 \text{ cm} = 80 \text{ cm} \xrightarrow{\lambda = vT} T = 0.08 \text{ S}$$

$$\Rightarrow \Delta t = 0.05 - 0.01 = 0.04 = \frac{T}{2} \rightarrow$$

هر نوبت در این مدت
ماضی $\frac{1}{2} \times 4 \text{ A}$
طی می‌ماند.

$l = 6 \text{ cm}$

- 171

$$\gamma = 2\alpha$$

- 172

$$\frac{\lambda_2}{\lambda_1} = \frac{v_2}{v_1} = \frac{\sin \theta_2}{\sin \theta_1} = \sqrt{2}$$

- 173

$$\frac{500}{375} = \frac{4 \times 125}{3 \times 125} \Rightarrow f_1 = 125 \text{ Hz} \rightsquigarrow 750 + 125 = 875 \text{ Hz}$$

- 174

-175 \Rightarrow UV $7 \rightarrow 2$ به پنجمین خط بالمر

$$\frac{1}{\lambda} = 0.011 \left(\frac{1}{2^2} - \frac{1}{7^2} \right) \Rightarrow \lambda \approx 396 \text{ nm}$$

-176 $E = \frac{1200}{\lambda(\text{nm})} = 8 \text{ eV}$ $k_A = 8 - 4.5 = 3.5$ $k_B = 8 - 3 = 5$

$$\% \Delta K = \frac{\Delta K}{K_B} \times 100 = \frac{1.5}{5} \times 100 = 30\%$$

-177 $E_{100\text{cm}} - E_{30\text{cm}} = 1.6 \times 10^4$ $\Rightarrow E_{100\text{cm}} = 1.8 \times 10^4 \text{ N/C}$
 $\frac{1}{9} E_{100\text{cm}}$

$$E_{1\text{m}} = \frac{1}{100} E_{100\text{cm}} = 180 \text{ N/C}$$

-178 q_3 مقابل $q_2 \Rightarrow \frac{q_2}{x^2} = \frac{\frac{9}{4} q_2}{(r+x)^2} \Rightarrow x = 2r$

q_1 مقابل $q_3 \Rightarrow \frac{q_3}{(3r)^2} = \frac{q_2}{r^2} \Rightarrow |q_3| = 9|q_2|$

مقابل \rightarrow خارج $q_2, q_3 \leftarrow q_2, q_3$ مختلف علامت اند.

- 179

$q < 0$
 حرکت به سمت چپ $\Rightarrow \Delta U > 0$

$$|\Delta U| = |Eq \cdot d_{\text{eff}}| = +0.15 \text{ ج}$$

$$q_{\text{new}} = q_{\text{old}} - 6 \mu\text{C}$$

- 180

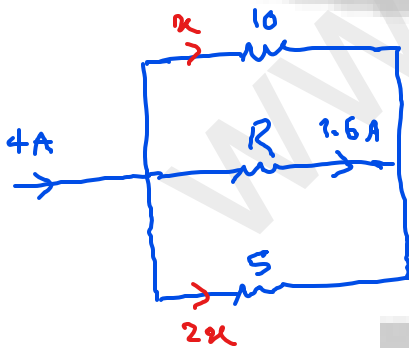
$$\Delta U = \frac{1}{2C} (q_n^2 - q_0^2) \Rightarrow 28.5 \mu\text{J} = \frac{1}{2 \times 2 \mu\text{F}} ((q_0 - 6)^2 - q_0^2)$$

$$\rightarrow q_{\text{old}} = 60 \mu\text{C}$$

منذوب : $6(2q - 6)$

$$\hookrightarrow q = CV = V_i = 5 \text{ V}$$

- 181



$$3A = 4 - 1.6 = 2.4 \text{ A} \quad \rightarrow \eta = 0.8$$

$$\hookrightarrow I_R = I_S \Rightarrow R = 5$$

$$\hookrightarrow U_R = RI^2 t = 19.2 \text{ kJ}$$

۱۸۲ - فاصله وسط اتصال ندارد ←

$$I = \frac{16 - 4}{(4 + 6 + 3) + 2} = 0.8 \text{ A}$$

$$V = 4 + 3I = 6.4 \text{ V}$$

حالت اول → $I = \frac{18}{5 + 4 + 1} = 1.8 \text{ A} \Rightarrow V_5 = 5 \times 1.8 = 9 \text{ V}$ -183

حالت دوم → $V_5 = V_{20} = 18 - \cancel{V_{r=1}} - V_{4\Omega}$ -(5I')

$$I' = \frac{18}{[(5 \parallel 20) + 4] + 1} = 2 \text{ A}$$

8 V

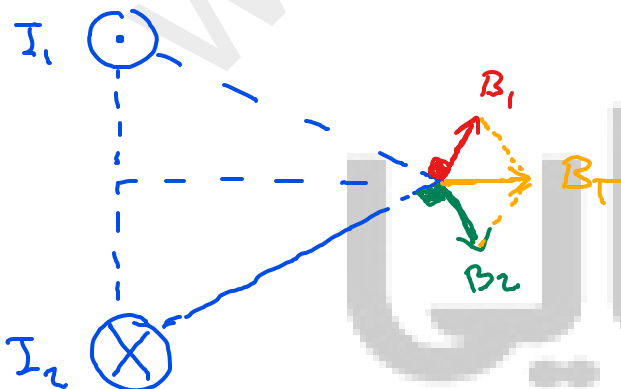
1 V کاهش می یابد

① $l \times \frac{1}{4} \Rightarrow R \times \frac{1}{4}$

$R \times 4 \Rightarrow R_{\text{new}} = 24$ -184

② $m \times 4 \Rightarrow R \times 16$

-185



زاویه بین طاقه و میدان

$$\varphi = AB \sin \theta \Rightarrow 2 \times 10^{-2} \times 4 \times 10^{-3} \times \frac{\sqrt{3}}{2} = (4\sqrt{3} \times 10^{-5})^{-187}$$

$$T = \frac{4}{5} \times \frac{1}{320} = \left(\frac{1}{400}\right) \quad t = \frac{1}{3200} = \left(\frac{T}{8}\right) \quad \varphi = \frac{\pi}{4} \quad -188$$

$$I = I_m \sin \varphi = \frac{\sqrt{2}}{2} \times 5\sqrt{2} = (5A)$$

$$\langle \text{مقدار} \rangle = 0.01 A \rightarrow (3.25 \pm 0.01 A) \quad -189$$

$$h_1 = h_2 - \Delta h \rightarrow \frac{1}{2} m \times 6^2 = \frac{1}{2} m \times 5^2 + m g \Delta h \quad -190$$

$$\Delta h = 0.55 m \rightarrow h_1 = 2.45 m$$

$$P_{out} = \frac{Av mgh}{t} = \frac{3000 \times 10 \times 24}{60} = (12 \text{ kw}) \quad -191$$

$$\eta = \frac{P_{out}}{P_{in}} \times 100 = (60 \%)$$

-193

$$P = P_{Hg} + P_A + P_0 \xrightarrow{\text{ظرف متحرک}} P = \frac{mg}{A}$$

$$\Rightarrow 2 \times \frac{0.136 \times 10}{5 \times 10^{-4}} + 76 \text{ cm Hg} = 108.8 \text{ kPa}$$

0.76 x 136 k

$$P_{\text{air}} = 191 \text{ cm}^3 \Rightarrow 1 \text{ m}_{\text{air}} = 10 \text{ kPa}$$

$$P_{\text{Hg}} = 13.6 \text{ " } \Rightarrow 1 \text{ m}_{\text{Hg}} = 136 \text{ kPa}$$

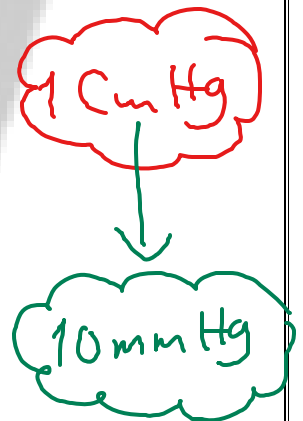
-194

$$P_g + 68 \text{ cm}_{\text{oil}} = 68 \text{ cm}_{\text{air}} + P_0$$

تقریباً ای کاز:

$$P_g - P_0 = 68 \text{ cm}_{\text{air}} - 68 \text{ cm}_{\text{oil}} = 1 \text{ cm Hg}$$

$$\begin{cases} P_A = 1 \\ P_{\text{Hg}} = 13.6 \end{cases} \rightarrow 68 \text{ cm}_{\text{air}} = 68 \times \frac{1}{13.6} \text{ cm Hg} = 5 \text{ cm}$$



$$\begin{cases} P_{\text{oil}} = 0.8 \\ P_{\text{Hg}} = 13.6 \end{cases} \rightarrow 68 \text{ cm}_{\text{oil}} = 68 \times \frac{0.8}{13.6} \text{ cm Hg} = 4 \text{ cm}$$

$\frac{A}{B}$ $\Delta V = 3x \cdot \sqrt{\cdot} \cdot \Delta \theta \rightarrow \frac{\Delta V_A}{\Delta V_B} = \frac{1}{4}$ -195

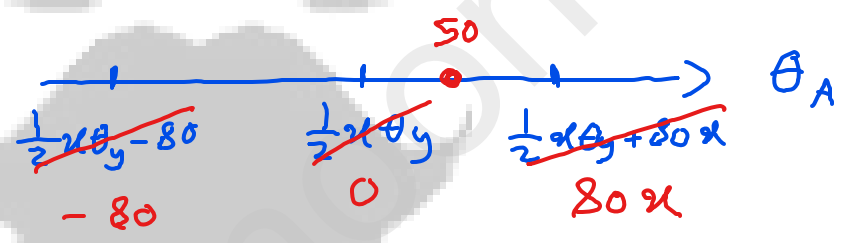
$\frac{A}{B}$ $Q = mc \Delta \theta \Rightarrow \frac{\Delta \theta_A}{\Delta \theta_B} = 2$

196 - بیخ در حل زوبنه‌نات.

$m_T = m$

$\theta_y = 0$

$\eta = \frac{m_y}{m_A}$



$\frac{50 - 0}{80x - 0} = \frac{450g}{m_A} = \frac{m}{m_A} = \frac{m'}{m_A}$

$\frac{5}{8} m_A = m'_A$

$m_{TA} = m_A + m'_A = \frac{13}{8} m_A = 520$

$m_A = 320g$

-197

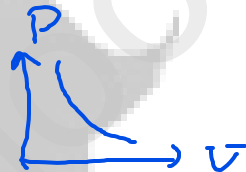
حالت دوم
→
تساوی


$$= P_1 = 2 \times 10^5 \text{ Pa}$$

$$P_2 V_2 = P_3 V_3 \quad 0.8 V_2$$

$$\Rightarrow P_3 = 2.5 \times 10^5 \text{ Pa}$$

198 - حذف گزینه 1 → هم‌فشار - کاهش حجم : A-B

B-C : هم‌دما ⇒  → حذف گزینه 4

در فرآیند هم‌دما حاصل‌ضرب PV ثابت می‌ماند ⇒  3

199 - حذف گزینه های 3 و 4 → هم‌حجم : A-B ⇒ $W = 0$

B-C : هم‌فشار ⇒ $Q = \frac{5}{2} P \Delta V = \frac{5}{2} n R \Delta \theta$

$$\rightarrow Q = \frac{5}{2} \times 1 \times 8 \times 300 = 6000 \text{ J}$$

- 200

$$n_F = n_i - n_{out} \quad \eta = \frac{PV}{RT}$$

$$n_{out} = \left(\frac{PV}{RT}\right)_F - \left(\frac{PV}{RT}\right)_i$$

$$M_{out} = n_{out} \times M_{O_2} = 80g$$

رضا مینایی



رضا مینایی



رضا مینایی



رضا
مینائی