

①

پاسخ تشریحی سوالات فیزیک کنکور ارشد ریاضی ۱۴۰۴

۴۱) ⑤ گزین

۴۲) ③ گزین

۴۳) ① گزین

۴۴) ۲۵ kWh = ۲۵ × ۳۶۰۰ MJ = ۹۰ MJ ② گزین

۴۵) $\Rightarrow \begin{vmatrix} 5 \\ 15 \\ 25 \\ 35 \end{vmatrix} \Rightarrow h = 1.0m$

$\Rightarrow \begin{vmatrix} 5 \\ 15 \end{vmatrix} \Rightarrow \text{ارتفاع از سطح زمینی} = 1.0 - 2.0 = 9.0m$
 ④ گزین

۴۶) $\left. \begin{aligned} x_A &= \frac{1}{2} \times \frac{1}{2} t^2 + 0 = \frac{1}{4} t^2 \\ x_B &= \frac{1}{2} \times 2(t-2)^2 + 0 = t^2 - 4t + 4 \end{aligned} \right\} x_A = x_B \Rightarrow \begin{cases} t = 2s \\ t = 4s \end{cases}$

$v_A = v_B \Rightarrow \frac{1}{2} t = 2(t-2) \Rightarrow \boxed{t = 4s}$

① گزین $\Rightarrow$ فاصله B از A در حال کاهش است. (۴، ۲)

14 (v)

$$x_A = vt + x_0$$

$$t = 5s \Rightarrow x_B = x_A$$

$$x_B = \frac{1}{2}at^2 + vt + x_0$$

$$\frac{1}{2}a \times 5^2 + 10 \times 5 = 10 \times 5 + 0$$

$$10a = -10 \Rightarrow a = -2 \text{ m/s}^2$$

(f) سرف

15) $v = rt \Rightarrow$

$$a = 4t \Rightarrow (t, v): a_{av} = \frac{v}{t} = \frac{4t}{t} = 4 \text{ m/s}^2 \quad \text{د سرف}$$

19) $m = 1 \text{ kg}$

$$v_i = 0 \text{ m/s}$$

$$F_{\text{net}} = -1 \text{ N}$$

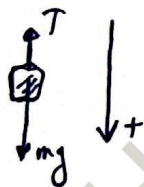
$$v_f = -0.5 \text{ m/s}$$

$$\Delta t = ?$$

$$F_{\text{net}} = \frac{m \Delta v}{\Delta t}$$

$$-1 = \frac{1(-0.5 - 0)}{\Delta t} \Rightarrow \Delta t = 0.5 \text{ s} \quad \text{د سرف}$$

21)



$$a = \frac{F_{\text{net}}}{m} \Rightarrow a = \frac{mg - T}{m} \Rightarrow a = \frac{0.4 \times 9.8 - 3.5}{0.4}$$

$$a = 1.2 \text{ m/s}^2 \quad \text{د سرف}$$

21) $\frac{a_r}{a_i} = \frac{F_r}{F_i} \times \frac{m_i}{m_r} \Rightarrow \frac{r}{1r} = 1 \times \frac{m_i}{m_r} \Rightarrow m_r = r m_i$

$$m_r = m_r - m_i = r m_i$$

$$F_r = F$$

$$\frac{a_r}{a_i} = \frac{F_r}{F_i} \times \frac{m_i}{m_r} \Rightarrow \frac{a_r}{1r} = 1 \times \frac{1}{r} \Rightarrow a_r = \frac{1}{r} \text{ m/s}^2$$

(1) سرف

۱۳

۵۲)

$$T = \frac{\Delta t}{N} = \frac{1.14}{3} \text{ s}$$

$$r = 1.0 \text{ cm} = 0.01 \text{ m}$$

$$v = \frac{2\pi r}{T} = \frac{2\pi \times 0.01}{1.14/3} = 0.105 \text{ m/s}$$

$$F_c = f_{s(\max)}$$

$$\frac{mv^2}{r} = \mu_s \times mg$$

$$v^2 = r \times \mu_s \times g$$

$$v = \sqrt{r \times \mu_s \times g} = \sqrt{0.01 \times 1.0 \times 10} = 0.316 \text{ m/s}$$

① سچ

$$۵۳) \quad v = \sqrt{\frac{F}{\rho \cdot A}}$$

$$\frac{v_B}{v_A} = \sqrt{\frac{F_B}{F_A}} \times \sqrt{\frac{\rho_A}{\rho_B}} \times \sqrt{\frac{A_A}{A_B}}$$

$$\frac{v_B}{1.0} = 1 \times 1 \times \sqrt{1} \Rightarrow v_B = 1.0 \text{ m/s} \quad ② \text{ سچ}$$

۵۴) ۲

$$۵۵) \quad m = 1 \text{ kg}$$

$$d = \frac{mg}{k} = 1/100 \text{ cm} \Rightarrow k = 100 \text{ N/m}$$

$$A = 2 \text{ cm}$$

$$k_{\max} = ? \text{ mJ} = E = \frac{1}{2} k A^2$$

$$= \frac{1}{2} \times 100 \times (2 \times 10^{-2})^2$$

$$= 1 \times 10^{-2} \text{ J}$$

$$= 10 \text{ mJ} \quad ③ \text{ سچ}$$

$$۵۶) \quad v_A > v_B$$

$$d_A > d_B \Rightarrow$$

③ سچ

۵۷) ۳ سچ

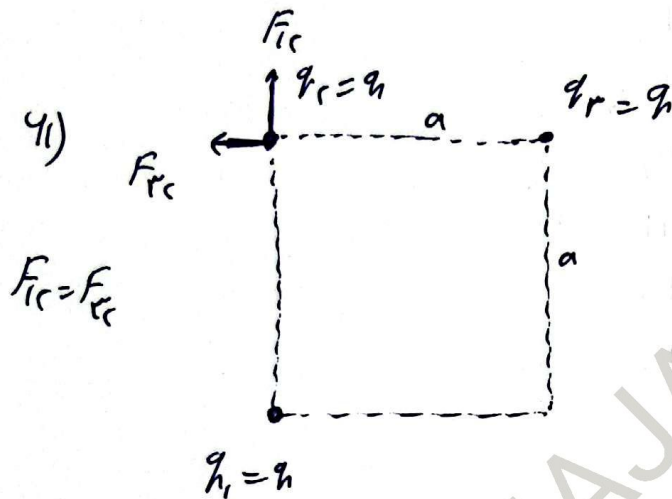
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88) ①

89) ②

$$9.) \quad N = \frac{N_0}{14} = \frac{N_0}{r^2} \Rightarrow n = r \Rightarrow t = rT$$

$$1 = rT \Rightarrow T = \frac{1}{r} h$$



$$F_{rc} = k \frac{q^2}{a^2}$$

$$F_T = \sqrt{2} F_{rc} = \sqrt{2} k \frac{q^2}{a^2}$$

$$\frac{F_T}{F_{rc}} = \sqrt{2}$$

92) $\begin{cases} V = \text{const.} \\ C = rC \end{cases} \Rightarrow U = \frac{1}{C} C V \Rightarrow U = rU$

$E = \frac{\Delta V}{d} \rightarrow \vec{E} \Rightarrow E' = E$

93) $I = \frac{11 - 4}{r + 1 + r} = \frac{1}{4} = 1A$

①) $\begin{cases} \text{کوتاهترین مسافت} = \varepsilon_r I + r I = 4 \times 1 + 1 \times 1 = 5W \\ \text{کوتاهترین مسافت} = \varepsilon_1 I - r_1 I = 11 \times 1 - 1 \times 1 = 10W \end{cases} \left\{ \frac{r_0}{r_c} = \frac{d}{\lambda} \right.$

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$$4f) \text{ معادله } f_A = f_B$$

$$L_A = 2 L_B$$

$$m_A = \frac{1}{2} m_B$$

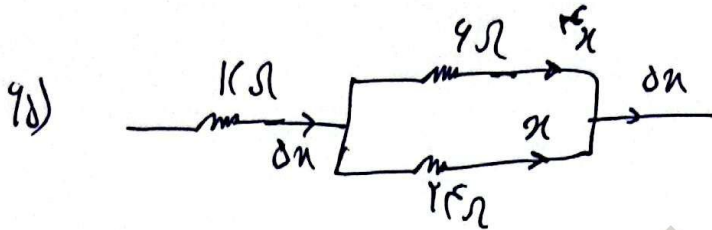
$$\frac{f_A}{A_A} \times \frac{A_A}{L_A} = \frac{1}{2} \frac{f_B}{A_B} \times \frac{A_B}{L_B}$$

$$A_B = 4 A_A$$

$$R = f \frac{L}{A}$$

$$\frac{R_A}{R_B} = \frac{f_A}{f_B} \times \frac{L_A}{L_B} \times \frac{A_B}{A_A} = 1 \times 2 \times 4 = 8$$

پس



$$\frac{12 \Omega \text{ ولتاژ دسره}}{9 \Omega \text{ ولتاژ دسره}} = \frac{12 \times \delta n}{4 \times x} = \frac{3}{1} \quad \text{پس}$$

4e) 1)

$$4v) B = \mu_0 \frac{N}{L} \times I \Rightarrow 10^{-4} \times 10^{-2} = \mu_0 \times \frac{N}{10^{-1}} \times 1 \times 10^{-2}$$

$$10^{-4} \times 10^{-2} = N \times \pi \times 10^{-7} \Rightarrow N = 100 \quad \text{پس}$$

$$4h) \Rightarrow \phi = B \times A \times (\cos 90^\circ - \cos 0^\circ) = 10^{-4} \times 10^{-2} \times \pi \times (-1) = -10^{-6} \text{ wb}$$

پس

$$4g) P_g = f \cdot g \cdot h \quad \therefore h = \frac{100 \text{ cm}^3}{10 \text{ cm}^2} = 10 \text{ cm}$$

$$f_n h_n = f_{H_2} h_{H_2} \Rightarrow 12 \times 10 = 134 \times h_{H_2} \Rightarrow h_{H_2} = 8.96 \text{ cm} \quad \text{پس}$$

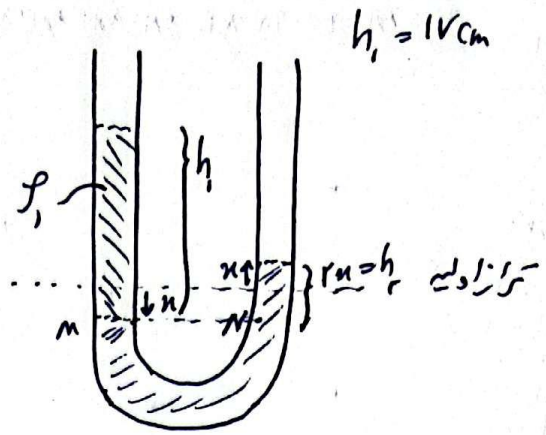
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$$v_i) \quad P_m = P_n$$

$$f_1 \times h_1 = f_2 \times h_2$$

$$r \times 14 = 1.75 \times r$$

$$r = 1.75 \text{ cm} \quad \text{①}$$



$$vi) \quad W_T = \Delta K \Rightarrow W_T = \frac{1}{2} m (v_c^2 - v_i^2)$$

$$r \times 1.75 = \frac{1}{2} \times 90 (v_c^2 - v_i^2)$$

$$1.75 = v_c^2 - v_i^2 \Rightarrow v_c = 14.2 \text{ km/h}$$

$$v_c = 3.9 \text{ m/s} \quad \text{②}$$

$$vii) \quad \frac{K}{m} : A$$

$$: B$$

$$\begin{cases} m_A = r m_B \\ K_A = \frac{1}{r} K_B \end{cases}$$

$$v_A' = v_A + r v_B$$

$$K_A' = K_B \Rightarrow K_A' = r K_A \Rightarrow (v_A + r)^2 = r v_A^2$$

$$v_A + r = \sqrt{r} v_A \Rightarrow v_A = \frac{r}{\sqrt{r}-1}$$

$$v_A = (r\sqrt{r} + r) \text{ m/s} \quad \text{③}$$

viii) ④

$$vix) \quad \left. \begin{aligned} \frac{P_1 \cdot V_1}{n_1 T_1} &= \frac{P_2 \cdot V_2}{n_2 T_2} \\ V_1 &= V_2 \\ P_1 &= P_2 \end{aligned} \right\} \begin{aligned} n_1 \cdot T_1 &= n_2 \cdot T_2 \\ \frac{n_1}{n_2} &= \frac{T_2}{T_1} \end{aligned}$$

$$\frac{n_2 - n_1}{n_1} = \frac{T_1 - T_2}{T_2} = \frac{-1}{1.2 + 1.75} = \frac{-1}{2.95}$$

$$\frac{n_2 - n_1}{n_1} = \frac{T_1 - T_2}{T_2} = \frac{-1}{1.2 + 1.75} = \frac{-1}{2.95} \quad \text{④}$$

v) ⑤