

به نام خدا

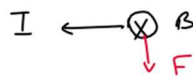
نام دبیر: حسین طرفی (دبیر کانون قلمچی و مدارس اهواز - رتبه ۵۷۱ کنکور سراسری)

پاسخ تشریحی سوالات فیزیک کنکور ۱۴۰۱ رشته ریاضی

$$\frac{151}{214} \frac{\text{kg}}{\text{h}} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ mile}}{1600 \text{ m}} \times \frac{1 \text{ h}}{40 \text{ min}} = 2 \frac{\text{m}}{\text{s}} \quad (3)$$

$$\frac{152}{\frac{\Delta v}{v_1} \times 100 = 3 \times 100 = 3 \times 3 \times 10^{-2} \times 100 \times 100 = 18 \times 10^{-1} = 1.8 \quad (4)$$

$$\frac{153}{F = ILB = 2.5 \times 2.5 \times 10^{-2} = 3 \times 10^{-2} \text{ N} \quad (2)$$

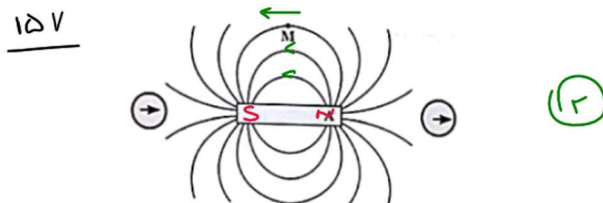


$$\frac{154}{P \rightarrow n \quad (1) \text{ در دایس پوزیترون، پروتون، نوترون تبدیل می شود.}}$$

$$\frac{155}{v = \sqrt{\frac{F}{\rho A}} \rightarrow v^2 = \frac{F}{\rho A} \rightarrow F = v^2 \cdot \rho A$$

$$F = 20^2 \times 1 \times 10^3 \times 2 \times 10^{-4} = 10 \text{ N} \quad (3)$$

$$\frac{156}{\frac{V_r}{V_1} = \frac{N_r}{N_1} \rightarrow \frac{V_r}{250} = \frac{90}{50} \rightarrow V_r = \frac{90 \times 250}{50} = 450 \quad (2)$$



128 $\gamma f_1 = 140 \rightarrow f_1 = 10 \text{ Hz}$
 $f_2 = \gamma f_1 = \gamma \varepsilon_0 \text{ Hz} \rightarrow f_2 - f_1 = \gamma \varepsilon_0 - 10 = 140 \text{ Hz}$

(1)

129 $I = I_m \sin \frac{\gamma \pi}{T} \cdot t = \gamma \sin \frac{\gamma \pi}{0.1 \cdot \gamma} t = \gamma \sin 10 \pi t$

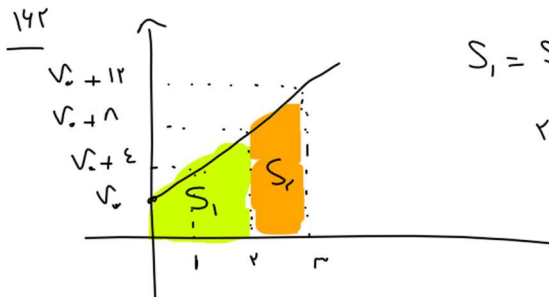
(4)

130 $\underline{a)} W = \Delta K = 0 \checkmark$ $\underline{b)} K_1 = K_2, U_1 < U_2 \rightarrow E_1 < E_2 \checkmark$

131 $W_{\text{tot}} = W_{\text{int}} + W_{\text{ext}}$ $\underline{c)} \text{ die}$
 $E_1 < E_2, U_1 < U_2$

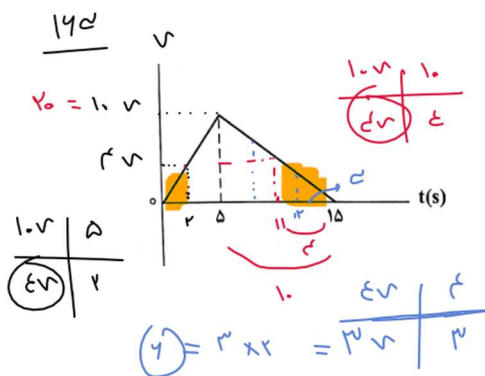
141 $W = -P \Delta V = -10^5 (1.2 - 1) \times 10^{-2} = +20 \text{ J}$

(14)



$S_1 = S_2 + \varepsilon \rightarrow \frac{v_0 + 1 + v_0}{2} \times 1 = \frac{v_0 + 1 + v_0 + 1 + \varepsilon}{2} \times 1 + \varepsilon$
 $2v_0 + 1 = v_0 + 1 + \varepsilon \rightarrow v_0 = 1 - \varepsilon = 1$

(14)



$\Delta x = S_{\text{tot}} - S_{\text{int}} = \frac{1}{2} \times 1 \times 1 - \left(\frac{1}{2} \times 1 \times \varepsilon + \frac{1}{2} \times \varepsilon \times \varepsilon \right)$
 $= 100 - (\varepsilon + \varepsilon^2) = 99 = 100 - \varepsilon \rightarrow \varepsilon = 1 \text{ m/s}$

(14)

۱۷۷ $E_B = \frac{\gamma}{\epsilon} E_A \rightarrow \lambda_B = \frac{\epsilon}{\gamma} \lambda_A = \frac{\epsilon}{\gamma} \times 10. = 2. \text{ nm}$

$\lambda_B - \lambda_A = \frac{\epsilon}{\gamma} \lambda_A - \lambda_A = \frac{1}{\gamma} \lambda_A = 0. \rightarrow \lambda_A = 10. \text{ nm}$

(۷)

$f_A = \frac{c}{\lambda_A} = \frac{\gamma \times 10^9}{2 \times 10^9 \times 10^{-9}} = 1.5 \times 10^{15} \rightarrow \Delta f = 1.5 \times 10^{15} - 0.5 \times 10^{15}$

$f_B = \frac{c}{\lambda_B} = \frac{\gamma \times 10^9}{2 \times 10^9 \times 10^{-9}} = 1.5 \times 10^{15}$

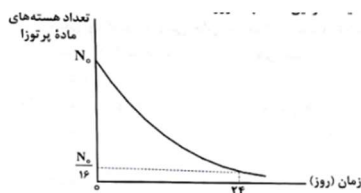
۱۷۸ $K = \frac{1}{2} m v^2 = \frac{1}{2} \times 9 \times 10^{-31} \times 20 \times 10^6 = 9 \times 10^{-25} \text{ J} = 5.625 \text{ eV}$

(۱)

$E = W_0 + K = 2.15 \text{ eV} + 5.625 \text{ eV} = 7.775 \text{ eV} = \frac{hc}{\lambda} \rightarrow \lambda = \frac{1240}{7.775}$

$\rightarrow \lambda = \frac{1240}{7.775} = 159.4 \text{ nm}$

۱۷۹



$N_0 \rightarrow \frac{N_0}{2} \rightarrow \frac{N_0}{4} \rightarrow \frac{N_0}{8} \rightarrow \frac{N_0}{16}$

(۱)

$\frac{N_0}{2} = 22$

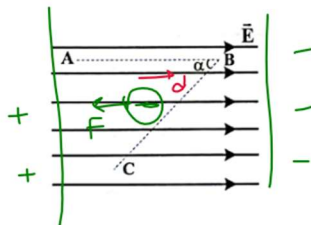
$\frac{N_0}{16} = 7$

(۱۷۹)

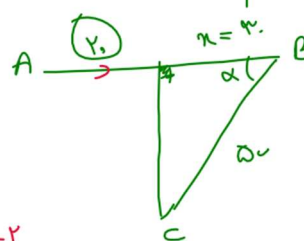
$\frac{F_r}{F_t} = \left(\frac{r_1}{r_r} \right)^2 = \left(\frac{r_1}{112 r_1} \right)^2 = \frac{1}{12544} = 0.0000079$

(۴)

(۱۸۰)



$\cos \alpha = \frac{r}{\omega} = \frac{1}{2} \rightarrow \alpha = 60^\circ$



$W = -Eqd = -1.0 \times 10^{-18} \times 10^6 \times 10^{-2} = -1.0 \times 10^{-14} \text{ J}$

(۱۷)

$\Delta U = -W = +1.0 \times 10^{-14} \text{ J}$

111

$\vec{E} = -2 \times 10^5 \hat{i} - 1.4 \times 10^5 \hat{j}$

12 → 😊 بدن نیاز حل

112

$$U = \frac{1}{2} C \cdot V^2 \rightarrow 2 \times 10^{-2} = \frac{1}{2} \times C \times 10 \rightarrow C = 10^{-4} F = 1 \mu F$$

$$C = k C_0 \rightarrow k = \frac{10}{2} = 5$$

(5)

113

$V = \varepsilon_1 - I r_1 \rightarrow 12 = 10 - 2I \rightarrow I = 2A$

$$I = \frac{\varepsilon_2 - \varepsilon_1}{R + r_1 + r_2} \rightarrow 2 = \frac{18 - 10}{R + 2 + 1} \rightarrow R = 1$$

(12)

114

① $P_1 = \frac{V^2}{4R} = \frac{2V^2}{4R}$

② $P_2 = \frac{V^2}{\frac{4R}{2}} = \frac{2V^2}{4R} = \frac{\varepsilon^2 V^2}{4R}$

$$\rightarrow P_2 - P_1 = \frac{V^2}{4R} = 9 \rightarrow \frac{V^2}{R} = 36 \xrightarrow{V=18} \frac{18 \times 18}{R} = 36$$

(12)

→ R = 9

115

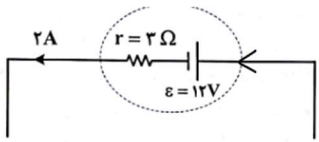
$I = \frac{4}{10} = 0.4 A$

$$V_A + 18 - 1.5 \times 0.4 = V_E$$

$$V_A = -10.4 V$$

(5)

124



$$P = \varepsilon I + r I^2 = 24 + 8 = 32$$

125

$$4 \times 10^{-11} = 1.6 \times 10^{-19} \times 1 \times h \rightarrow h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s}$$

126

$$P_A = P_B \rightarrow m_A v_A = m_B v_B \rightarrow \frac{m_B}{m_A} = \frac{v_A}{v_B}$$

$$\frac{k_A}{k_B} = \frac{m_A}{m_B} \times \left(\frac{v_A}{v_B} \right)^2 = \frac{m_A}{m_B} \times \frac{m_B}{m_A} = 1$$

$$r = \frac{m_B}{r} \rightarrow m_B = 1 \text{ kg}$$

129

$$\frac{P_{N_2}}{P_{He}} = \frac{m_{N_2}}{m_{He}} \times \frac{M_{He}}{M_{N_2}} = \frac{2}{4} = \frac{1}{2} \rightarrow P_{He} = 2 P_{N_2} = \frac{2}{3} P_0$$

$$P_g = \frac{2}{3} P_0 + \frac{2}{3} P_0 = \frac{4}{3} P_0 \rightarrow P_g = \frac{4}{3} P_0 - P_0 = \frac{1}{3} P_0$$

130

$$W = -\frac{1}{r} \times 2 \times 10^{-2} \times 10 \times 10^{-2} = -2 \times 10^{-4} \text{ J}$$

$$\Delta U = 0 \rightarrow W = -Q \Rightarrow Q = +2 \times 10^{-4} \text{ J}$$

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