

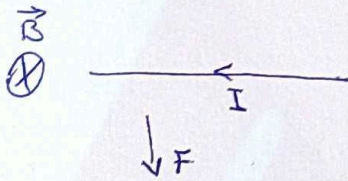
حل سوالات فیزیک کنکور 1401 - آریس علی-امینی الف سار

$$\frac{216 \text{ km}}{\text{h}} \times \frac{1 \text{ h}}{60 \text{ min}} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ mi}}{1800 \text{ m}} = 2 \frac{\text{mi}}{\text{min}} \quad (151)$$

$$\Delta V = V_1 3 \alpha \Delta T = V_1 \times 3 \times 3 \times 10^{-5} \times 200 = 1,8 \times 10^{-2} V_1 \quad (152)$$

$$\frac{\Delta V}{V_1} \times 100 = 1,8 \%$$

$$F = B I l \sin \theta \rightarrow F = 0,5 \times 10^{-4} \times 2,5 \times 2,4 \times \sin 90^\circ = 3 \times 10^{-4} \text{ N} \quad (153)$$



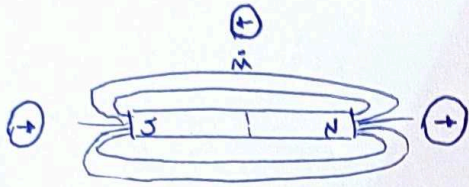
$$\text{Energy} + p^+ \rightarrow n^0 + e^+ \quad \text{پوزیترون} \quad (154)$$

$$v = \sqrt{\frac{F}{\mu}} \quad \mu = \frac{m}{L} = \frac{\rho V}{L} = \frac{\rho A L}{L} = \rho A$$

$$\Rightarrow v = \sqrt{\frac{F}{\rho A}} \Rightarrow 25 = \sqrt{\frac{F}{1,000 \times 2 \times 10^{-6}}} \Rightarrow F = 10 \text{ N} \quad (155)$$

$$\frac{v_2}{v_1} = \frac{N_2}{N_1} \Rightarrow \frac{v_2}{240} = \frac{900}{50} \Rightarrow v_2 = 4320 \quad (156)$$

حل مسائل فیزیک کنکور 1401 - آگاهی علمی - آموزشی الف شماره



(157) 2

$$f_1 = 160 \text{ Hz}, f_3 = 320 \text{ Hz}$$

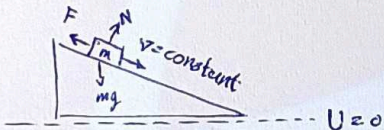
(158) 1

$$f_n = \frac{nD}{2L} \rightarrow f_3 - f_1 = f_2 = 160 \text{ Hz}$$

$$I = I_{\max} \sin \frac{2\pi}{T} t = 2 \sin \frac{2\pi}{0.02} t = 2 \sin 100\pi t$$

(159) 4

$$\Rightarrow \sum W = 0 \text{ تندی ثابت}$$



الف - کار سطح = نیروی N عمود بر جابجایی = 0 ✓

ب - چون تندی ثابت پس کار ثابت و 0 کم می شود

پس $E = k + U$ کم می شود ✓

(160) 1

ب - کار نیروی وزن صفر است اما از قضیه کار انرژی

داریم $\sum W = 0$ پس نیروی خارجی دیگری باید وجود داشته باشد X

ت - در قسمت «ب» توضیح داده شد

$$W = p \Delta V = 10^5 \times 0.15 \times 10^{-3} = 50 \text{ J}$$

(161) 2

چون حجم گاز کم شده پس کار انجام شده روی گاز مثبت است

حل مسائل فیزیک کنکور 1401 - آکادمی علمی - آموزشی الفشار

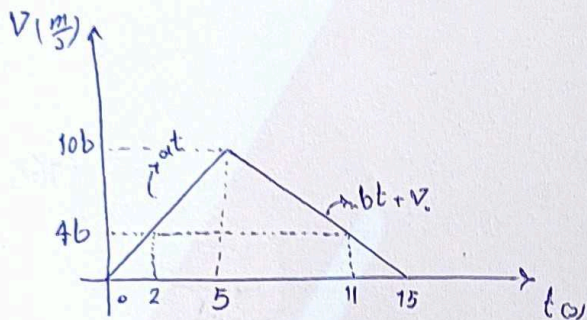
$$t=0 \quad t=1 \quad t=2 \quad t=3$$

بندی

$$\Delta x_{(t=0 \rightarrow 1)} = \Delta x_{(t=2 \rightarrow 3)} + 4 \quad (162)$$

$$8 + 2v_0 = (18 + 3v_0) - (8 + 2v_0) + 4 \Rightarrow v_0 = 6$$

4 ✓



$$\left. \begin{array}{l} t=5 \quad 5a = -5b + v_0 \\ t=15 \quad v_0 = 15b \end{array} \right\} a = 2b$$

(163)

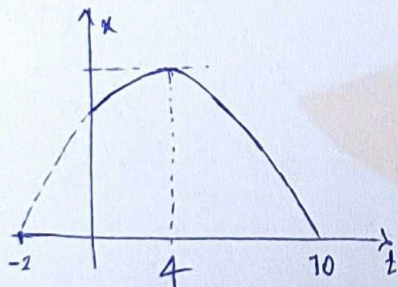
$$t=2 \rightarrow v_0 = at = 2bt = 4b$$

$$t=11 \rightarrow v_0 = -bt + 15b = 4b$$

$$\Delta x_{(t=2,11)} = 9 \times 4b + \frac{1}{2} \times 9 \times 6b = 36b + 27b = 126 \rightarrow b = 2$$

$$t=12 \rightarrow v = -2t + 30 \rightarrow v = 6$$

4 ✓

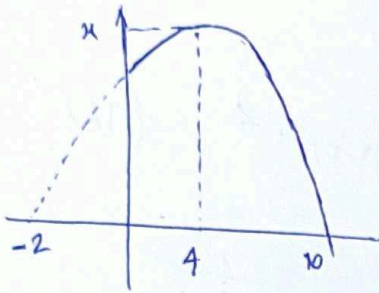


164 از تقارن من استفاده کنیم

$$x = a(t+2)(t-10) = a(t^2 - 8t - 20)$$

$$t=8 \rightarrow x = -20a$$

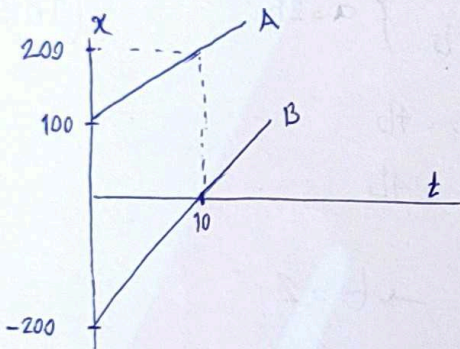
$$t=2 \rightarrow$$



(164) ارتفاع کسی برای نوشتن عبارت استفاده کنیم

$$x = a(x+2)(t-10) = a(t^2 - 8t - 20) \quad \underline{1}$$

مشتق زمانی $v = 2at \rightarrow \begin{cases} t=8 \rightarrow v=16a \\ t=2 \rightarrow v=4a \end{cases} \rightarrow \frac{v_{t=8}}{v_{t=2}} = 4$



$$x_A = 10t + 100$$

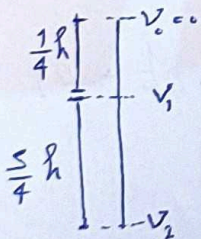
$$x_B = 20t - 200$$

(165)

$$|x_B - x_A| \leq 20$$

$$\Rightarrow |10t - 300| \leq 20 \Rightarrow 28 \leq t \leq 32$$

(166)



$$v_1^2 - v_0^2 = 2 \times 10 \times \frac{1}{4} h$$

$$\rightarrow v_1^2 = 5h$$

$$v_2^2 - v_1^2 = 2 \times 10 \times \frac{3}{4} h$$

$$\rightarrow v_2^2 = 20h$$

چون شتاب ثابت است

$$\bar{v} = \frac{v_1 + v_2}{2} = 15 \frac{m}{s} \Rightarrow \sqrt{5h} + \sqrt{20h} = 30$$

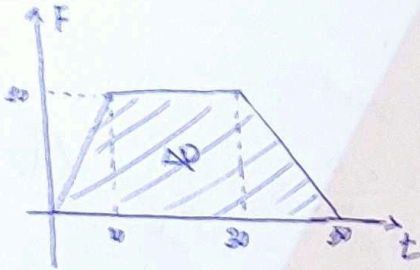
$$\Rightarrow 25h + 20h = 900 \rightarrow h = 20$$

$$\bar{v} = \frac{v_0 + v_2}{2} = \frac{\sqrt{20h}}{2} = \frac{20}{2} = 10 \frac{m}{s} \quad \underline{1}$$

$$F = \frac{\Delta P}{\Delta t} \Rightarrow f = \frac{200 - 100}{\Delta t} \rightarrow \Delta t = 25$$

4

(167)

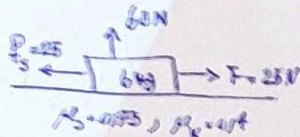


$$\Delta P = \frac{70 \times 20}{2} = 700$$

$$F = \frac{\Delta P}{\Delta t} = \frac{700}{50} = 14$$

1

(168)



$$f_{s, \text{max}} = 0.75 \times 60 = 45 \text{ N}$$

5

(169)

$$f_{\text{net}} = |f_s + N| = \sqrt{25^2 + 60^2} = \sqrt{625 + 3600} = \sqrt{4225} = 65$$

$$k = \frac{1}{2} m \left(\frac{2\pi r}{T} \right)^2 = \frac{1}{2} \times 5 \times \left(\frac{2\pi \times 2}{2} \right)^2 = 10\pi^2$$

3

(170)

$$B = 10 \log \frac{I}{I_0} \Rightarrow 60 = 10 \log \frac{I}{I_0} \rightarrow \frac{I}{10^{-12}} = 10^6 \rightarrow I = 10^6$$

2

(171)

$$I = \frac{P}{4\pi r^2} \Rightarrow 10^{-6} = \frac{P}{4 \times 3 \times 50^2} \Rightarrow P = 12 \times 2500 \times 10^{-6} = 30 \times 10^{-3}$$

$$T = 2\pi \sqrt{\frac{m}{k}} = 2\pi \sqrt{10 \times \frac{1}{50}} = 0.175$$

(172)

$$\text{تعداد اعداد} = \frac{0.15}{0.17} = \frac{5}{7} = 7 + \frac{1}{7} \rightarrow \text{جایگاری} = A$$

$$\text{مقدار} = 5A$$

3

$$T = 2\pi \sqrt{\frac{L}{g}} \Rightarrow 1 = 2\pi \sqrt{\frac{L}{10}} \Rightarrow 1 = \frac{4 \cdot 10 \cdot L}{10} \rightarrow L = \frac{1}{4} \text{ m}$$

$$L = 25 \text{ cm} \quad \underline{2} \quad (173)$$

$$V_{\max} = Aw = 0,04 \times \sqrt{\frac{500}{\text{m}}} \Rightarrow V_{\max}^2 = 16 \times 10^{-4} \times \frac{500}{\text{m}} = \frac{0,8}{\text{m}} \quad (174)$$

$$E - K = \frac{1}{2} m V_m^2 - \frac{1}{2} m \left(\frac{\sqrt{2}}{2} V_m \right)^2 = \frac{1}{2} m \left(\frac{1}{2} \times \frac{0,8}{\text{m}} \right) = 0,12 \text{ J} \quad \underline{4} \quad (175)$$

$$E_A = E$$

$$E_B = E - 0,25 E \Rightarrow E_B = 0,75 E_A \quad (176)$$

$$\frac{hc}{\lambda_B} = 0,75 \frac{hc}{\lambda_A} \quad , \quad \lambda_B - \lambda_A = 50 \text{ nm} \rightarrow \lambda_B - 0,75 \lambda_B = 50 \text{ nm}$$

$$\Rightarrow \lambda_A = 0,75 \lambda_B$$

$$\rightarrow \lambda_B = 200 \text{ nm}$$

$$\lambda_A = 150 \text{ nm} \quad \underline{2} \quad (177)$$

$$\Delta f = \frac{3 \times 10^8}{150 \times 10^{-9}} - \frac{3 \times 10^8}{200 \times 10^{-9}} = \left(\frac{3}{15} - \frac{3}{20} \right) 10^{16} = \frac{1}{20} \times 10^{16} = 5 \times 10^{14}$$

$$K_{\max} = \frac{1}{2} m v^2 = \frac{1}{2} (9 \times 10^{-31}) \times (5 \times 10^5)^2 = 1,125 \times 10^{-19} \text{ J} \quad (177)$$

$$= \frac{1,125}{1,6} \text{ eV} = 0,703 \text{ eV}$$

$$K_{\max} = \frac{hc}{\lambda} - W \Rightarrow 0,703 = \frac{hc}{\lambda} - 4,46 \rightarrow \lambda = \frac{1240}{5,2} = 240 \text{ nm} \quad \underline{1} \quad (178)$$

$$\frac{N}{N_0} = \frac{1}{2^n} \rightarrow \frac{1}{16} = \frac{1}{2^n} \rightarrow n = 4$$

(178)

$$n = \frac{t}{T} \rightarrow 4 = \frac{24}{T} \rightarrow T = 6$$

✓

$$r_1 = r$$

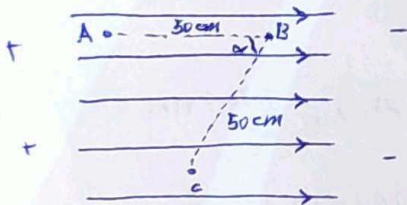
$$r_2 = r + 0.12r$$

$$\frac{F_2}{F_1} = \frac{\frac{kq_1q_2}{(1.12r)^2}}{\frac{kq_1q_2}{r^2}} = \frac{1}{1.44} = \frac{69}{100} \approx 70\%$$

(179)

30٪ کاهش یافته

✓



$$\Delta U_{AB} = qEd \cos 0$$

(180)

$$\Delta U_{BC} = qEd \cos \alpha$$

$$\Delta U_{Tot} = \Delta U_{AB} - \Delta U_{BC}$$

$$= qEd - 0.16(qEd) = 0.14 qEd$$

در جابجایی AB ذره منفی

به منفی انرژی گدازده پس $\Delta U_{AB} < 0$

در جابجایی BC ذره منفی در خلاف

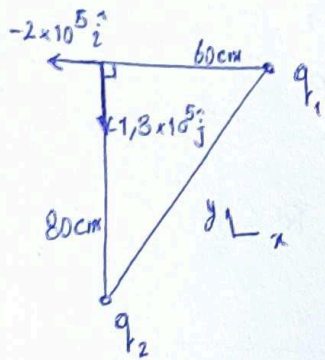
جهت میدان حرکت کرده پس $\Delta U_{BC} > 0$

ذره منفی در کل ABC در جهت

میدان حرکت کرده پس $\Delta U_{Tot} < 0$

$$\Rightarrow 0.14 \text{ J} \quad \text{انرژی}$$

✓



$$E_1 = +2 \times 10^5 = \frac{k q_1}{r^2} = \frac{9 \times 10^9 \times q_1}{36 \times 10^{-2}}$$

$$q_1 = 8 \mu C$$

درست است

فقط همان میدان از q_1 خارج می شود پس بار q_1 مثبت است

(181)

$$2 \times 10^{-3} = \frac{1}{2} C_2 \times (20)^2$$

$$U = \frac{1}{2} C V^2$$

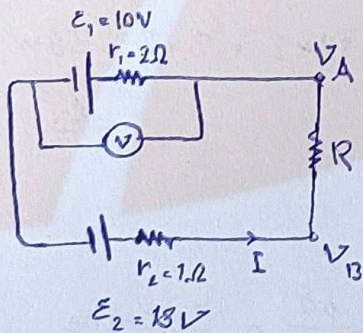
(182)

$$2 \times 10^{-3} = \frac{1}{2} k (5 \times 10^{-6}) \times 400$$

$$\frac{C_2}{C_1} = k$$

4

$$k = 2$$



$$E_1 + I r_1 = 14 \rightarrow I = 2 A$$

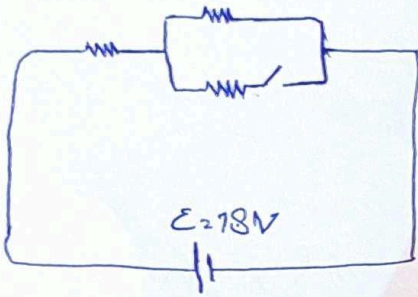
(183)

$$V_A - E_1 - I r_1 + E_2 - I r_2 = V_B$$

$$\Rightarrow V_A - V_B = E_1 - E_2 + I r_1 + I r_2$$

$$= 10 - 18 + 2 + 4 = -2 V$$

1



قبل بستن $R_{T1} = 2R$

بعد بستن $R_{T2} = R + \frac{R \times R}{R+R} = \frac{3}{2}R$

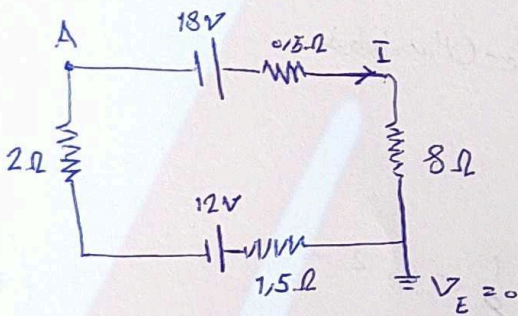
$P = \frac{V^2}{R}$

2

(184)

$P_{T2} - P_{T1} = 9 \Rightarrow \frac{18^2}{\frac{3}{2}R} - \frac{18^2}{2R}$

$\frac{2 \times 18^2}{3R} - \frac{18^2}{2R} = \frac{4 \times 18^2 - 3 \times 18^2}{6R} = \frac{18^2}{6R} = 9 \rightarrow R = 6$

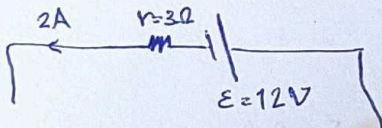


$I = \frac{18 - 12}{0.5 + 1.5 + 8 + 2} = 0.15A$

4 (185)

$V_E - 12 - 0.15 \times 1.5 - 0.15 \times 2 = V_A$

$\Rightarrow V_A = -13.75V$



$P_{\text{داده}} = \Sigma I + rI^2 = 12 \times 2 + 3 \times 2^2 = 36W$ (186)

2

$\rho = \rho g h \Rightarrow 68 \times 10^3 = 13.6 \times 10^3 \times 10 \times h \rightarrow h = \frac{68}{136} = 50cmHg$ (187)

1

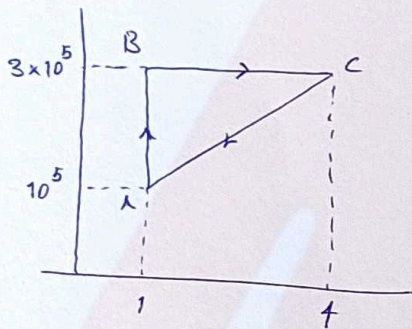
$$n = \frac{m}{M_0} \rightarrow n M_0 = m \rightarrow 28 \text{ gr} = n \times 4 \rightarrow n_{\text{He}} = 7$$

(189)

$$pV = nRT \rightarrow p = \frac{nRT}{V} = \frac{5}{4} P_0 = \frac{1 \times RT}{V}$$

$$p_{N_2 + He} = \frac{8RT}{V} = 8 \times \frac{5}{4} P_0 = 10 P_0$$

(3)



$$W = -5$$

$$Q = -W = 5 = \frac{(2 \times 10^5)(3 \times 10^{-3})}{2} = 300 \text{ J}$$

(1) (190)

09121750697 - مکتبہ علمی - امڈیش الف - مشار

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