Fizika 2018 variant

1) $\begin{cases} x = 2+t \\ y = 1+2t \end{cases}$ (A)

$t = x-2$

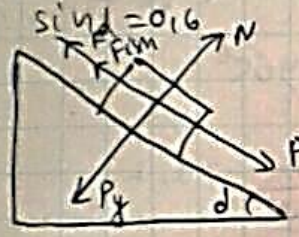
$y = 1+2x-4 = 2x-3$

2) $a_n = 0$, $a_\tau < 0$ va $a_\tau = const$ (B)

3) $\vartheta_{ur} = \frac{l_{ko'cha}}{t_{ko'cha}} =$

$= \frac{-1-1,6}{0,2} = -13$ m/s (A)

4) $\sin\alpha = 0,6$



$F + F_{ish} = 15 + 14mg\cos\alpha$

$= 15 + 5 \cdot 8 \cdot 0,8 =$

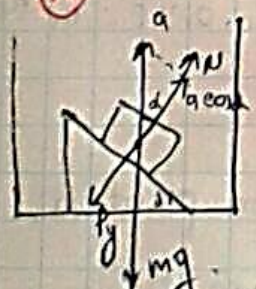
$= 47$

$P_x = mg\sin\alpha = 80 \cdot 0,6 =$

$= 48$

$P_x > F + F_{ish} \Rightarrow$ yetarli emas (A)

5)

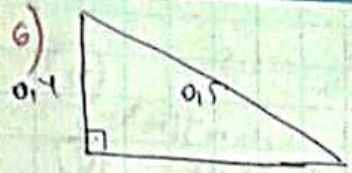


(B)

$N - mg\cos\alpha = ma\cos\alpha$

$N = m(g+a)\cos\alpha$

6)



$\frac{mv^2}{2} = F_{ish} \cdot l + mgh$

$\frac{mv^2}{2} = N mg\cos\alpha \cdot l + mgh$

$\frac{v^2}{2} = 0,3 \cdot 10 \cdot 0,6 \cdot 0,5 + 4$

$v = \sqrt{9,8} = 3,13$ m/s =

$= 313$ sm/s (A)

7) $P^2 = P_1^2 + P_2^2$

$P_2 = \sqrt{P^2 - P_1^2} = \sqrt{P^2 - \frac{P^2}{4}} =$

$= \frac{P\sqrt{3}}{2}$ (D)

8) $\frac{W_2}{W_1} = \frac{C_2 \nu_2 R}{C_1 \nu_1 R} = \frac{5 \cdot 6 \cdot 5}{1,5 \cdot 4}$

$\nu_1 = \nu_2$

$= \frac{1}{1,1}$ (A) 1,1 marta

9) $M = M_1 + M_2 = F_1 l_1 + F_2 l_2$

$= 13 \cdot 0,2 + 10 \cdot 0,1 =$

$= 2,6 + 1 = 3,6$ N·m (A)

10) $\frac{Q_1}{Q_2} = \frac{\frac{5}{2} \cdot 2RT}{\frac{3}{2} \cdot 2RT} =$

$= \frac{5}{3} = 1,67$ (A)

11) $A_{1ad.} = -\frac{5}{2} \nu R(T_2 - T_1)$

$= \frac{5}{2} \nu R(T_1 - T_2)$

$A_{2izob} = \nu R(T_3 - T_2)$

$T_1 = T_3$

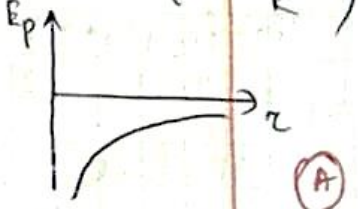
$A_1 + A_2 = A$

$\frac{7}{2} \nu R \Delta T = A$

$\nu R \Delta T = 6$

$21 - 6 = 15$ (C)

12) $E_p = \left(-G\frac{m_1 m_2}{R}\right)$



(A)

13) 3,4 (C)

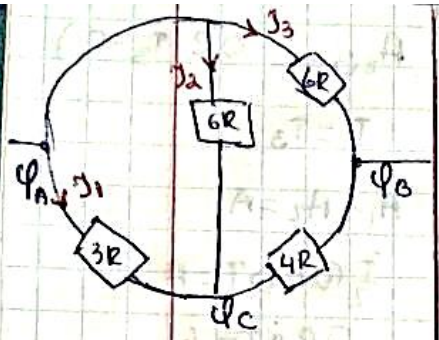
14) $\vartheta = 340$ km/s

Pozitronning massasi protonga nisbatan juda kichik bolgani u-n protonning tezligi o'zgarmaydi.

$\vartheta = 340$ km/s (D)

15) (A)

16)



$I = I_1 + I_2 + I_3$

$$\begin{cases} \varphi_A - \varphi_C = I_1 \cdot 3R \\ \varphi_A - \varphi_C = I_2 \cdot 6R \\ \varphi_C - \varphi_B = (I_1 + I_2) \cdot 4R \\ \varphi_A - \varphi_B = I_3 \cdot 6R. \end{cases}$$

$I_1 \cdot 3R = I_2 \cdot 6R$

$I_1 = 2I_2$

$\varphi_A - \varphi_B = 3I_1R + 3I_2 \cdot 4R$

$= 6I_2R + 12I_2R = 18I_2R$

$18I_2R = 6I_3R$

$I_3 = 3I_2.$

$\varphi_A - \varphi_B = (I_1 + I_2 + I_3)R_{ym}$ (D)

$R_{ym} = \frac{18I_2R}{6I_2} = 3R$

17) $\frac{W_e}{V} = \frac{cu^2}{2V} =$

$= \frac{\varepsilon\varepsilon_0 S u^2}{2d \cdot V} = \frac{q^2}{2C \cdot V} =$

$= \frac{q_1^2 d}{2\varepsilon\varepsilon_0 S \cdot V} = 0,2$

$\frac{d}{2\varepsilon\varepsilon_0 S \cdot V} = \frac{0,2}{25}.$

$225 \cdot \frac{0,2}{25} = 1,8.$ (A)

$1,8 - 0,2 = 1,6 \text{ mJ/m}^3$

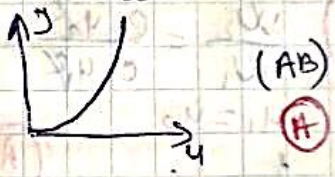
18) Nolga teng (C)

19) $N = 100 W$
$T_1 = 3000K$
$U = 220V$
$T_2 = 2700K$
$I = ?$

$N = \frac{U^2}{R} \Rightarrow R = \frac{U^2}{N} = 484.$

$484 \longrightarrow 3000$
$R \longrightarrow 2700$
$R = 435,6$

$I = \frac{U}{R} = \frac{220}{435,6} = 0,5A$ (B)

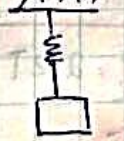
20) 

(AB) (H)

21) $R = \frac{U}{I}$

$I \approx 0$ $R = (\infty)$ (B)

22) (A)

23) 

$k = 30 N/m.$
$m = 0,42 kg$
$a = 5,6 m/s^2$

$x = x_m \sin \omega t.$

$5,6 = \underbrace{x_m \omega^2}_{a_m = 10} \sin \omega t$

$\sin \omega t = 0,56$ (C)

$x = 0,56 x_m = 0,56A$

24) $I = I_0 \cos^2 \alpha.$

$I = I_0 \cos^2 45 = \frac{I_0}{2}$ (1)

$I_x = I_0 \cos^2 60 = \frac{I_0}{4}.$ (2)

2 marta ↓ (C)

25) (C)

26) KL buyum kösza-tilmagan.

27) (A)

28) $m_0 c^2 \left(\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} - 1 \right) =$

$= 0,1 m_0 c^2$

$\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} = 1,1.$

$1 - \frac{v^2}{c^2} = \frac{1}{1,21}.$

$v = 0,4c.$

$P = mv = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}} \cdot v =$ (C)

$= 1,1 m_0 \cdot 0,4c = 0,44 m_0 c$

29) (D)

30) 6ta proton,

6ta neytron

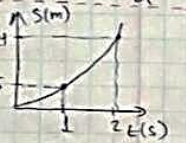
4ta elektron.

(A)

2-variant.

1) $\begin{cases} x = at + b \\ y = ct + d \end{cases}$ $\quad t = \frac{x-b}{a}$

$y = c \cdot \frac{x-b}{a} + d = \frac{c}{a}x - \frac{bc}{a} + d$ (A)

2) 

$s = v_0 t + \frac{at^2}{2}$.

$\begin{cases} 5 = v_0 + \frac{a}{2} \\ 14 = 2v_0 + 2a \end{cases}$ $\quad \begin{cases} v_0 + \frac{a}{2} = 5 \\ v_0 + a = 7 \end{cases}$

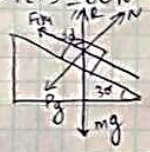
$a = 4$, $v_0 = 3$. (C)

$a = ?$

3) $h = \frac{gt^2}{2} = \frac{1,6 \cdot 4^2}{2} = 0,8 \cdot 16 = 12,8$ m (D)

4) $F_{nat} = ma = 12,5 = 60$N (B)

5) $\alpha = 30°$, $m = 5$kg, $\cos\varphi = ?$



$\cos\varphi = \frac{F_{ish}}{R} = \frac{mg\sin\alpha}{mg} =$

$= \sin 30 = \frac{1}{2}$ (A)

6) 

$\mu = 0,5$, $v_{min} = ?$

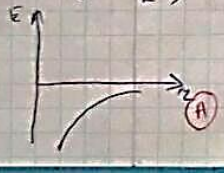
$\frac{mv_{min}^2}{2} = F_{ish} \cdot l + mgh$

$\frac{mv^2}{2} = \mu mg\cos\alpha \cdot l + mgh$

$v = \sqrt{20}$ m/s (A)

7) (H)

8) $E_p = \left(-\frac{Gm_1m_2}{R}\right)$



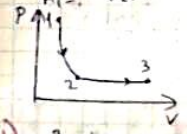
(A)

9) $Q = 2$mol, $M = 20$ g/mol, $\frac{Q_1}{Q_2} = ?$

$\frac{Q_1}{Q_2} = \frac{\frac{5}{2} \cdot 2RT}{\frac{3}{2} \cdot 2RT} = 1,67$ (B)

10) $i = 6$, $T_1 = T_3$, $A = 20$ kJ.

$A_1 = ?$ $A_2 = ?$



$A = A_1 + A_2 = 20$

$-\frac{6}{2}\nu R(T_2 - T_1) + \nu R(T_3 - T_2) = 20$.

$4\nu R\Delta T = 20$ $\quad \nu R\Delta T = 5$ kJ

$20 - 5 = 15$ kJ (C)

11) $\frac{\frac{3}{2}pV}{\nu} = 18 \Rightarrow p = 12$ (D)

12) ε^2 marta ortadi, ya'ni 4,41 marta ↑ (C)

13) $v_p = 1,5v$, $m_p = 1840 m_{pozit}$, $v_{nat} = ?$

Protonning massasi juda katta bo'lganligi uchun u massiv devor vazifasini bajaradi.

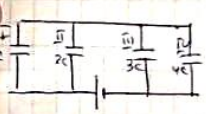
$v_{nat} = 0 + 2v_p = 3v$ (A)

14) $R = 32 = 45$sm, $F_1 = 24$N, $F_2 = 8$N. $M_{nat} = ?$

$M = F_1R + F_2 \cdot r =$

$= 24 \cdot 0,45 + 8 \cdot 0,15 =$

$= 0,15 \cdot 80 = 130$. (A)

15) 

I va II kondensatorlar parallel

Demak $U_1 = U_2 \Rightarrow \frac{U_1}{U_2} = 1$ (A)

$\frac{U_1}{U_2} = ?$

16) $q_1 = 4$ nC, $w_1 = 0,2$ mJ/m^3, $q_2 = 12$ nC, $\Delta w_0 = ?$

$w_1 = \frac{q_1^2}{2\varepsilon \cdot V} = 0,2$.

$w_2 = \frac{q_2^2}{2\varepsilon \cdot V} = x$.

$\frac{x}{0,2} = \left(\frac{q_2}{q_1}\right)^2$

$x = 1,8$ mJ/m^3

(A)

$\Delta w = 1,8 - 0,2 =$

$= 1,6$.

17) Faraday (C) (18) (A)

19) $R \longrightarrow T$
$R_x \longrightarrow T+\Delta T$
$R_x = \frac{R(T+\Delta T)}{T}$
$R_x - R = R\left(1+\frac{\Delta T}{T}-1\right) = \frac{R\Delta T}{T}$ (B)

20) (A) 21) (C)

22) $m = 10^{-6}$ kg
$q = 50\cdot10^{-6}$ C
$B = 0{,}2$ T
$v = 10$ m/s
$\varphi = \frac{\pi}{60}$
$R = ?$

$\varphi = \omega t = \frac{v}{R}\cdot t = \frac{v\cdot qB}{mv}\cdot t = \frac{qBt}{m}$
$t = \frac{\varphi m}{qB}$
$R = vt = v\cdot\frac{\varphi m}{qB} = \frac{\frac{\pi}{60}\cdot10^{-6}}{50\cdot10^{-6}\cdot0{,}2} =$
$= \frac{\pi}{60} = 5{,}23$ m (A)

23) (D)

24) $\frac{\sin t}{\sin(90-\alpha)} = \frac{n_2}{n_1} \Rightarrow \operatorname{tg}\alpha = \frac{n_2}{n_1}$ (A)

25) (D)

26) $\ell = R\cdot n = 40\cdot5{,}16\cdot10^{-6} = 64\cdot10^{-6}$ m.
$N = \frac{\ell}{R} = \frac{64\cdot10^{-6}}{48\cdot10^{-8}} = \frac{6400}{48} = 133$ (B)

27) $\gamma \sim v^4$ Demak, 16 marta ↓ (D)

28) $m\vartheta = 0{,}1\,m_0c$.
$\frac{m_0}{\sqrt{1-\frac{\vartheta^2}{c^2}}}\cdot\vartheta = 0{,}1\,m_0c$
$\vartheta = \frac{c}{\sqrt{101}}$
$E_k = m_0c^2\left(\frac{1}{\sqrt{1-\frac{\vartheta^2}{c^2}}}-1\right)$
$= 0{,}0005\,m_0c^2$ (D)

29) (B)

30) 6 ta proton.
6 ta neytron.
3 xarra musbat zar yadrosi → 3 ta elektron ni bóladi. (A)

3-Variant

1) $\begin{cases} x_1 = 3-2t \\ x_2 = 2t+15t \end{cases}$
$\left|\frac{v_2}{v_1}\right| = ?$
$v_1 = x_1' = -2$.
$v_2 = x_2' = 15$.
$\left|\frac{v_1}{v_2}\right| = \frac{2}{15} = \frac{1}{7{,}5}$. (B)

2) $s = v_0t + \frac{at^2}{2}$.
$\begin{cases} 5 = v_0 + \frac{a}{2} \\ 14 = 2v_0 + 2a \end{cases}$
$\begin{cases} v_0 + \frac{a}{2} = 5 \\ v_0 + a = 7 \end{cases}$
$\frac{a}{2} = 2$ $a = 4$ $v_0 = 3$
$\ell_k = v_0t + \frac{at^2}{2} = 30$.
$30 - 3 = 27$ m. (B)

3) $v_1 = 2{,}5v_2$
$\frac{a_1}{a_2} = ?$
$\omega_1 = \omega_2$.
$\frac{a_1}{a_2} = \frac{\omega_1 v_1}{\omega_2 v_2} = 2{,}5$ (A)

4) (A)

5) 2 ta (D)

6) $a = \frac{(m_2-m_1)}{m_2+m_1}g = \frac{3m-2m}{3m+2m}\cdot g = \frac{g}{5}$.
$T - 2mg = -2ma$
$T = 2m\left(g-\frac{g}{5}\right) = \frac{8mg}{5}$ (C)

7) $N_1 = 3\cdot10^3$ W
$v_1 = 5$ m/s.
$N_2 = 4\cdot10^3$ W
$v_2 = ?$
$\begin{cases} N_1 = kv_1^2 \\ N_2 = kv_2^2 \end{cases}$
$\frac{N_1}{N_2} = \left(\frac{v_1}{v_2}\right)^2$
$\frac{3\cdot10^3}{4\cdot10^3} = \left(\frac{5}{v_2}\right)^2$.
$\frac{\sqrt{3}}{2} = \frac{5}{v_2}$ $v_2 = \frac{10}{\sqrt{3}} =$
$= 5{,}8$ m/s (C)

8) $h=1{,}25m$, $\alpha=30°$, $t=0{,}1s$, $m=2kg$, $F=?$

$Ft=m\vartheta$

$F=\frac{m\cdot\sqrt{2gh}}{t}=\frac{2\cdot\sqrt{20\cdot1{,}25}}{0{,}1}=20\cdot5=100$ (A)

9) $m_1=m_2$ (A)

10) $-\frac{3}{2}\nu R(T_2-T_1)+\nu R(T_3-T_2)=A$

$\frac{5}{2}\nu R\Delta T=A$ (C)

$\frac{5}{2}\nu R\Delta T=10 \Rightarrow \nu R\Delta T=4$ $\quad 10-4=6$.

11) $\frac{Q_1}{Q_2}=\frac{(1+\frac{5}{2})\cdot 2RT}{(1+\frac{3}{2})\cdot 2RT}=\frac{7}{5}=1{,}4$ (B)

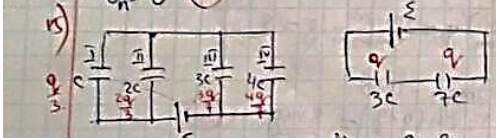
12) $\frac{3}{2}PV=450$, $\frac{3}{2}\cdot P\cdot 30\cdot10^{-3}=450$ $\quad P=\frac{900}{90\cdot10^{-3}}=10kPa$ (C)

13) (C)

14) Protonning massasi juda katta bo'lganligi u-u pozitron uning tezligini o'zgartirolmaydi.

$\vartheta_n=\vartheta$ (A)

15)



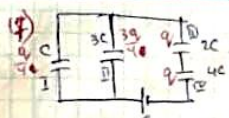
$\frac{U_1}{U_3}=\frac{q_1\cdot C_3}{C_1\cdot q_3}=\frac{q\cdot 7}{3\cdot 3q}\cdot 3=\frac{7}{3}$ (B)

$\frac{U_1}{U_3}=?$

16) $W_1=\frac{W_{el}}{V}=\frac{q^2\cdot d}{2\varepsilon_0 S\cdot S\cdot d}=\frac{\sigma^2}{2\varepsilon_0}=\frac{\sigma_2^2}{2\varepsilon_0}$

$\sigma_2=3\sigma_1$ $\quad W_2=\frac{(3\sigma)^2}{2\cdot2\cdot\varepsilon_0}=4{,}5W_1$ (A)

17)



$W=\frac{q^2}{2C}$.

$W_1=\frac{q_1^2}{2C_1}=\frac{q^2}{16\cdot2C}=\frac{q^2}{32C}$ $\quad W_2=\frac{9q^2}{16\cdot6C}=\frac{3q^2}{32C}$

$W_3=\frac{q^2}{4C}$ $\quad W_4=\frac{q^2}{2C}$

3da φ_n eng T, 1da eng ⊥ (D)

18)

$R_{um}=?$

$R_{um}=R+3R=4R$ (B)

19) $T_1=300K$, $R_1=10\Omega$, $T_2=423$, $R_2=?$

$10\Omega \longrightarrow 300K$

$R_2 \longrightarrow 423$

$R_2=\frac{4236}{309}=14{,}1\Omega$ (A)

20) (B) 21) (B)

22) $B=5T$, $\vartheta=10^6 m/c$, $\varphi=\frac{\pi}{18}$, $l=?$

$\varphi=\omega t=\frac{\vartheta}{R}\cdot t=\frac{\vartheta\cdot qB}{m\vartheta}\cdot t$

$t=\frac{\varphi m}{qB}$

$l=\vartheta t=10^6\cdot\frac{\frac{\pi}{18}\cdot9{,}1\cdot10^{-31}}{1{,}6\cdot10^{-19}\cdot5}=200nm$ (C)

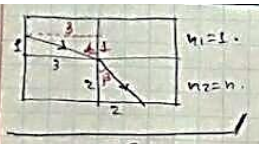
23) (A)

24) $\mu=1$, $\varepsilon=3$, $\alpha=?$

$tg\alpha=\frac{n_2}{n_1}=\sqrt{\varepsilon\mu}=\sqrt{3}$

$\alpha=60°$. (B)

25) Yoritilganlik → lyuks. (A)

26) 

$n=?$

$\sin\alpha=\frac{3}{\sqrt{10}}$ $\sin\beta=\frac{1}{\sqrt{2}}$

$\frac{\sin\alpha}{\sin\beta}=\frac{n_2}{n_1}=n$.

$n=\frac{3}{\sqrt{10}}\cdot\frac{\sqrt{2}}{1}=\frac{3}{\sqrt{5}}$ (C)

27) $P_{max}=0,0029/T$ (C)

28) $m\vartheta=0,1\,m_0c$.

$\frac{m_0\vartheta}{\sqrt{1-\frac{\vartheta^2}{c^2}}}\cdot\vartheta=0,1\,m_0c$

$\vartheta=\frac{c}{\sqrt{101}}$

$m=\frac{m_0}{\sqrt{1-\frac{\vartheta^2}{c^2}}}=\frac{\sqrt{101}}{10}m_0=$

$=1,005\,m_0$.

$\Delta m=0,005\,m_0$ (D)

29) (B)

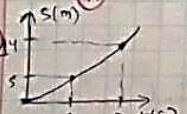
30) 6 ta proton, 6 ta neytron.

8 ta elektron. (A)

1) 4-variant

$\begin{cases}x=10-15t\\ y=30+20t\end{cases}$ $\begin{cases}\vartheta_{x1}=-15\\ \vartheta_{x2}=20\end{cases}\Rightarrow\vartheta_{no'l}=\sqrt{15^2+20^2}=25\,m/c$

(A)

2) 

$S=\vartheta_0t+\frac{at^2}{2}$.

$\begin{cases}5=\vartheta_0+\frac{a}{2}\\ 14=2\vartheta_0+2a\end{cases}$ $\begin{cases}\vartheta_0+a=7\\ \vartheta_0+\frac{a}{2}=5\end{cases}$

$a=4$.

$\vartheta_0=3$.

$P=\vartheta_0+\frac{a}{2}(2n-1)=3+\frac{4}{2}(2\cdot3-1)=13$ (A)

3) $\vartheta_1=7\vartheta_2$.

$\omega_1=\omega_2$

$\frac{a_1}{a_2}=?$

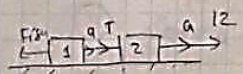
$\frac{a_1}{a_2}=\frac{\vartheta_1\omega_1}{\vartheta_2\cdot\omega_2}=7$. (C)

4) $m_1=2kg$.

$m_2=1kg$.

$F_t=12N,\ M=0,3$

$T'=?$



$12-F_{ish}=3a$.

$12-0,3\cdot3\cdot10=3a$.

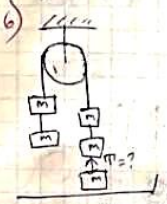
$a=1\,m/c^2$

$T-0,3\cdot1\cdot10=a$

$T=4$.

(D)

5) (A)

6) 

$T=?$

$a=\frac{m_1-m_2}{m_1+m_2}g=\frac{3m-2m}{3m+2m}\cdot g=\frac{g}{5}$.

$T=m(g-a)=\frac{4mg}{5}$. (D)

7) $m=100kg$.

$t=20\,kg/c$

$N=500W$

$E_k=?$

$F_q=20\vartheta$.

$500=20\vartheta^2$

$\vartheta=5\,m/c$

$E_k=\frac{m\vartheta^2}{2}=\frac{100\cdot25}{2}=$

$=1250\,J=\frac{5}{4}kJ$ (B)

8) $h=1,25m$

$\alpha=45^\circ$

$t=0,1s$.

$m=2kg$

$F=?$

$F\vartheta=m\vartheta$

$\vartheta=\sqrt{2gh}=\sqrt{20\cdot1,25}=5\,m/c$.

$F\cdot0,1=2\cdot5$. (A)

$F=100N$.

9) $m=10^3\,kg$.

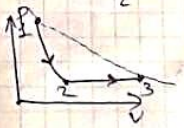
$\vartheta=500\,m/c$.

$N=?$

$N=F\cdot\vartheta=mg\cdot\vartheta=10\cdot10^3\cdot500=$

$=5\cdot10^6\,W$ (A)

10) $\frac{Q_1}{Q_2}=\frac{\frac{7}{2}\nu RT}{\frac{5}{2}\nu RT}=1,4$. (D)

11) 

$\frac{5}{2}\nu R(T_1-T_2)+\nu R(T_3-T_2)=14$.

$\frac{7}{2}\nu R\Delta T=14$. $\nu R\Delta T=4kJ$

$14-4=10kJ$. (C)

12) $\vartheta=120\,m/c$.

$M=2\cdot10^{-3}\,kg/mol$

$T'=?$

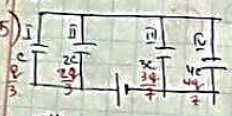
$\vartheta=\sqrt{\frac{3RT}{M}}\Rightarrow T=\frac{\vartheta^2M}{3R}=\frac{120^2\cdot2\cdot10^{-3}}{3\cdot8,31}=1,15\,k$

(A)

13) $\rho_1 = \rho_2$, $\gamma_1 = \gamma_2$, $R_2 = 1{,}1R$, $\frac{E_1}{E_2} = ?$

$\frac{E_1}{E_2} = \frac{U_1 \cdot d_2}{d_1 \cdot U_2} = \frac{\gamma_1 R_1 d_2}{\gamma_2 R_2 d_1} = \frac{\rho_1 q_1 d_2 q_2}{\rho_1 q_1 \rho_2 q_2} = \frac{1}{1{,}21}$ (B)

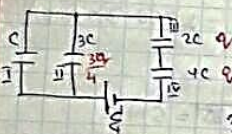
14) (A)

15) 

$\frac{W_1}{W_3} = \frac{q_1^2 \cdot 2{,}7C}{2C \cdot q_3^2} = 3 \cdot \left(\frac{q_1}{q_3}\right)^2 =$

$= 3\left(\frac{q \cdot 7}{3 \cdot 3q}\right)^2 = 3 \cdot \frac{49}{81} = \frac{49}{27}$ (B)

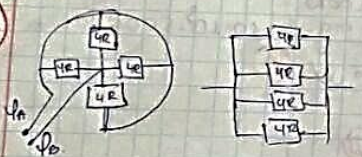
$\frac{W_1}{W_3} = ?$

16) 

$U_1 = \frac{q}{4C}$, $U_2 = \frac{3q}{4 \cdot 3C} = \frac{q}{4C}$, $U_3 = \frac{q}{2C}$, $U_4 = \frac{q}{4C}$

3-da eng ↑ (B)

17) (A)

18) 

$R_{um} = \frac{R}{4} = R$. (B)

$R_{um} = ?$

19) $T = 273 + 27 = 300$

300 —— 10R.

T —— 20R.

$T = 600K$. (C)

$600 - 273 = 327°C$

20) (B)

21) $E = 50 V/m$, $B = 10T$, $\vartheta = 5 m/c$, $t = 5s$, $\vartheta_x = ?$

$E = e\vartheta \rightarrow$ harakat tezligi o'zgarmas;

$\vartheta_x = \vartheta = 5 m/c$. (D)

22) $B = 2T$, $\vartheta = 15 \cdot 10^6 m/c$, $\varphi = \frac{\pi}{180}$, $R = ?$

$\varphi = \omega t = \frac{\vartheta}{R} \cdot t = \frac{\vartheta \cdot qB}{mv} \cdot t$

$t = \frac{\varphi m}{qB}$.

$R = \vartheta t = \vartheta \cdot \frac{\varphi m}{qB} = 15 \cdot 10^6 \cdot \frac{\pi}{180} \cdot \frac{m}{q} \cdot \frac{1}{2} =$

$= 20 mm$. (D)

23) (A) 24) (C) 25) (B)

26) $\vartheta_{max} = \vartheta_1 + \vartheta_2 = \vartheta + \frac{\vartheta}{2} = \frac{3\vartheta}{2}$. (C)

27) $b = 2{,}9 \cdot 10^{-3} m \cdot K$, $T = 309 K$, $R = ?$

$R = \frac{b}{T} = \frac{2900 \cdot 10^{-6}}{309} = 9{,}384 m$. (A)

28) $\frac{m_0}{m} = \frac{4}{5}$, $P = ?$

$\frac{m_0}{m} \cdot \sqrt{1 - \frac{\vartheta^2}{c^2}} = \frac{4}{5}$ $\quad \vartheta = 0{,}16c$.

$P = m\vartheta = \frac{5m_0}{4} \cdot \frac{3c}{5} = 0{,}75 m_0 c = \frac{3c}{4} \cdot \frac{4m}{5} = 0{,}6 mc$ (A)

29) $\frac{h}{2\pi}$ (B)

30) 1ota proton va 1ota neytron.

12, 10, 20. (A)

5-variant

1) $t = -3s$, $x = 900m$, $\vartheta = -15 m/s$, $x = ?$

$90 - 15t = 0$

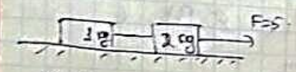
$t = 60s$.

$60 - 3 = 57s$ (C)

2) $a_n = const$, $a_\tau = 0$ (D)

3) $\vartheta = \sqrt{\vartheta_0^2 + (gt)^2} = \sqrt{4^2 + 3^2} = 5 m/s$ (D)

4)



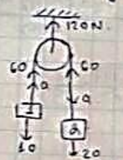
$m_1 = 2kg$
$m_2 = 1kg$
$F = 5N$
$\mu = 0,3$
$T = ?$

$F_{ish} = \mu mg = 0,3 \cdot 2 \cdot 10 = 6N$
1-yuk va sirt orasidagi ish. kuchi F dan katta. Demak $T = 0$ (D)

5)
$a_1 = a$
$k_1 = k$
$m = ?$

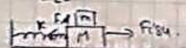
$m(g-a) = kx$
$m = \frac{kx}{g-a}$ (A)

6)
$m_1 = 2kg$
$m_2 = 1kg$
$F = 120N$
$a_1 = ?,\ a_2 = ?$



$$\begin{cases} 60-10 = 1 \cdot (a + a_x) \\ 60-20 = 2(a_x - a) \end{cases}$$
$a + a_x = 50$
$a_x - a = 20$ (C)

7)
$M = 4kg$
$m = 1kg$
$\mu = 0,2$
$k = 1000N/m$
$x_m = ?$



$F_{el} = F_{ish}$
$kx_m = \mu \cdot (M+m)g$
$x_m = \frac{\mu(M+m)g}{k} = \frac{10 \cdot 0,2 \cdot 5}{1000} = 0,01m = 1sm$ (A)

8)
$m = 100kg$
$\vartheta_0 = 4m/s$
$k = 20$
$l = 20m$
$\Delta E_k = ?$

$\frac{m\vartheta_0^2}{2} - \frac{m\vartheta^2}{2} = \frac{20 \cdot 4 + 20 \cdot \vartheta}{2} \cdot 20$
$100(4^2 - \vartheta^2) = 400(4+\vartheta)$
$4 - \vartheta = 4 \quad \vartheta = 0$
$\Delta E_k = \frac{100 \cdot 4^2}{2} = 800$ (B)

9)
$\alpha = 30°$
$M = 80kg$
$m_1 = 40 \cdot 10^{-3} kg$
$\vartheta_{0z} = 400m/s$
$F_q = 4N$
$l = ?$

$m\vartheta \cos 30° = 80 \cdot \vartheta_x$
$\vartheta_x = \sqrt{3}/10$
$F_q \cdot l = \frac{m\vartheta_x^2}{2} \Rightarrow l = 0,3$ (A)

10)
$$\begin{cases} P_1 = n_1 k_1 T_1 \\ P_2 = 3n_1 \cdot k \cdot 2T_1 \end{cases}$$
$\frac{P_2}{P_1} = 6$ (D)

11) (A)

12) $500 = \sqrt{\frac{3R \cdot T}{4 \cdot 10^{-3}}} \Rightarrow T = \frac{(500)^2 \cdot 4 \cdot 10^{-3}}{3 \cdot 8,31} = 40,1$ (C)

13) (D)

14)
$\frac{m\vartheta^2}{2} = E$
$m\vartheta = m \cdot \vartheta_1 + 4m\vartheta_1$
$\vartheta_1 = \frac{m\vartheta}{5m} = \frac{\vartheta}{5}$

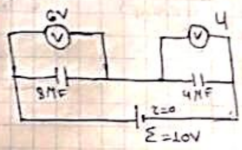
$E_k = \frac{5m \cdot \vartheta_1^2}{2} = \frac{5m}{2} \cdot \frac{\vartheta^2}{25} = \frac{m\vartheta^2}{2 \cdot 5} = \frac{E}{5}$ (A)

15)
$R = 0,09m$
$E = 18 \cdot 10^3 V/m$
$q_m = ?$

$E = \frac{kq}{R^2} \quad q = \frac{ER^2}{k} = \frac{18 \cdot 10^3 \cdot 81 \cdot 10^{-4}}{9 \cdot 10^9} = 16,2nC$ (A)

16) (A)

17)

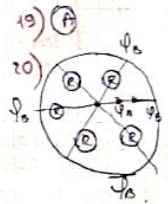


$6 + 4 = 10$
$U = 4V$
$q_1 = C_1 U_1 = 6 \cdot 8 = 48MF$
$q_2 = C_2 U_2 = 4 \cdot 4 = 16MF$ (C)

18)
$q = ?$
T — $\frac{U}{R}$
T_1 — $\frac{U}{R_x}$
$\frac{UT}{R_x} = \frac{UT_1}{R}$
$R_x = \frac{RT}{T_1}$ (A)
$I_x = \frac{U}{R_x} = \frac{U \cdot T_1}{RT} = \frac{IT_1}{T}$

19) (A)

20)



Hammasi parallel
$R_{um} = \frac{R}{5}$ (A)

21) (D)

22) $B = 4T$
$\vartheta = 1000 m/c$
$\varphi = \frac{\pi}{10}$
$l = ?$

$\varphi = \omega t = \frac{\vartheta}{R} \cdot t = \frac{\vartheta \cdot qB}{m\vartheta} \cdot t$

$t = \frac{\varphi m}{qB}$

$l = \vartheta \cdot \frac{\varphi m}{qB} = \frac{\frac{\pi}{10} \cdot m \cdot 8 \cdot 10^3}{q \cdot 4} =$

$= 6{,}5 Mm$ (B)

23)

$E_{p\,max} \rightarrow E_{k\,min}$

$\vartheta = 0$ $a_{max} = 9{,}8$

(D)

24) (B)

25) (A)

26) $R = 480 \cdot 10^{-9} m$
$d = 36 \cdot 10^{-6} m$
$n = 1{,}6$
$N = ?$

$N = \frac{d \cdot n}{R} = \frac{36 \cdot 10^{-6} \cdot 1{,}6}{480 \cdot 10^{-9}} = \frac{1600 \cdot 36}{480} =$

$= 120ta$ (C)

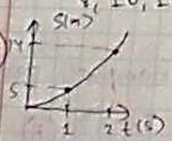
27) (C) 28) (A) 29) (B)

30) neytron → 10ta, proton → 10ta.

8, 10, 10ta (A)

B-variant.

1)



$\vartheta_{o'r} = ?$

$S = \vartheta_0 t + \frac{at^2}{2}$

$\begin{cases} 5 = \vartheta_0 + \frac{a}{2} \\ 14 = 2\vartheta_0 + 2a \end{cases}$

$a = 4$. $\vartheta_0 = 3$.

$\vartheta_{o'r} = \frac{\vartheta_0 t + \frac{at^2}{2}}{t} =$

$= \vartheta_0 + \frac{at}{2} = 3 + \frac{12}{2} =$

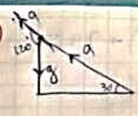
$= 9 m/c$ (D)

2) $t = -3S$
$x = -900m$
$\vartheta = 15 m/c$
$t = ?$

$-900 + 15t = 0$
$t = 60S$
$60 - 3 = 57S$

(A)

3)



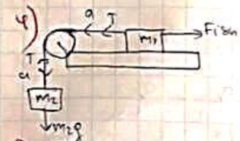
$a_{nis} = \sqrt{6^2 + 10^2 - 2 \cdot 10 \cdot 6 \cdot \left(-\frac{1}{2}\right)} = \sqrt{136 + 60} = 14 m/c^2$

$F_{og'} = m \cdot a_{nis} = 2 \cdot 14 = 28 N$.

yuklanish $= \frac{m \cdot a_{nis}}{mg} = \frac{28}{20} = 1{,}4$.

$F_{nat} = ma = 2 \cdot 6 = 12$. (D)

4)



$\begin{cases} T - \mu m_1 g = m_1 a \\ T - m_2 g = -m_2 a \end{cases}$ $\begin{cases} T - 18 = 6a \\ T - 40 = -4a \end{cases}$

$22 = 10a$ $a = 2{,}2 m/c^2$ (B)

5) (B)

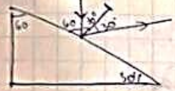
6) $\vartheta = 8 \cdot 10^3 m/c$
$a = 15g$

$h = \frac{\vartheta^2}{2a} = \frac{64 \cdot 10^6}{30 \cdot 10} = 213 km$ (A)

7) $P = ?$
$\begin{cases} P = k\vartheta^2 \\ 4P = k \cdot \vartheta_x^2 \end{cases}$

$\left(\frac{\vartheta_x}{\vartheta}\right)^2 = 4$. $\vartheta_x = 2\vartheta$ (C)

8)



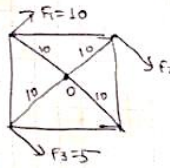
$h = 1{,}25 m$
$\alpha = 30°$
$t = 0{,}1S$
$m = 2kg$
$F = ?$

$2m\vartheta \cos 30 = F \cdot t$

$F = \frac{\sqrt{3} \cdot 2 \cdot \sqrt{20 \cdot 1{,}25}}{0{,}1}$ (A)

$= 20\sqrt{3} \cdot 5 = 173{,}2$

9)



$M_{nat} = ?$

Y: $M_n = M_1 + M_2 - M_3 = F_1 l_1 + F_2 l_2 - F_3 l_3 =$

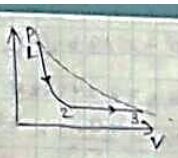
$= 10 \cdot 10 + 20 \cdot 10 - 5 \cdot 10 = 250 N \cdot m$ (A)

10) $n_2 = 4n_1$
$T_2 = \frac{T_1}{2}$
$\frac{P_2}{P_1} = ?$

$\frac{P_2}{P_1} = \frac{n_2 k T_2}{n_1 k T_1} = 4 \cdot \frac{1}{2} = 2$

(C)

11) $A_T = 21kJ$; $A_1 = ?$, $A_2 = ?$



$-\frac{3}{2}\vartheta R(T_2 - T_1) + \vartheta R(T_3 - T_2) = 21$

$\frac{5}{2}\vartheta R\Delta T = 21$

$\vartheta R\Delta T = 8,4$.

$Q = \frac{5}{2}\vartheta R\Delta T = \frac{5}{2}\cdot 8,4 = 21$ ①

12) Quyosh ⟶ 99% plazmadan iborat ②

13) $S = 10\cdot 10^{-4} m^2$
$q = 2C$
$\frac{q}{\varepsilon_0} = 1,8\cdot 10^{-8}$ C·m/F
$E = ?$

$E = \frac{U}{d} = \frac{q}{cd} = \frac{q}{\varepsilon\varepsilon_0 S}$

$= \frac{1,8\cdot 10^{-8}}{10^{-3}} = 1,8\cdot 10^{-5} V/m$. ③

14) $E - \frac{E}{5} = \frac{4E}{5}$ ②

15) $R_1 = R_2$.
$q_1 = q$.
$q_2 = 2q$
$E_p = ?$

$E_1 = \frac{K\cdot 8q^2}{R}$

$\varphi_1' = \varphi_2'$

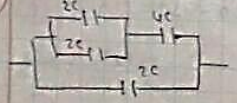
$\frac{K(q+q_x)}{R} = \frac{K(2q-q_x)}{R}$

$2q_x = q$ $\quad q_x = \frac{q}{2}$.

$E_2 = \frac{K\left(\frac{2q}{2}\right)^2}{R} = \frac{9}{4}\cdot\frac{Kq^2}{R}$

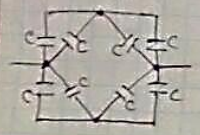
$\frac{E_2}{E_1} = \frac{9}{4\cdot 2} = \frac{9}{8}$ ⇒ 9 marta ② ③

16) Sxemani soddalashtiramiz:



$C_{u1} = 4C$.
$C_{u2} = 2C$
$C_3 = 2C + 2C = 4C$. ④

17) Sxemani soddalashtiramiz:



$C_{umum} = 2C$

④

18) $S = 1,1\cdot 10^{-6} m^2$.
$l = 3m$
$J = 0,5A$
$\rho_x = 1,1\cdot 10^{-6} \Omega\cdot m$
$U = ?$

$U = J\cdot R = J\cdot\frac{\rho l}{S} = 0,5\cdot 3 = 1,5$ ②

19) ④ 20) ② 21) B. 22) A 23) ④

24) ⑧ 25) geometrik optikaga ⑧

26) $\vartheta_{max} = \vartheta_1 + \vartheta_2 = 3\vartheta$ ⑤

27) ④

28) $t_1 = 20$
$t_2 = 10$
$\vartheta = \frac{\sqrt{21}}{5}c$
$\frac{t_x = 12}{t_y = ?}$

$t = t_0\sqrt{1 - \frac{\vartheta^2}{c^2}}$ $\quad t_0 \rightarrow$ yerdagi vaqt, $t \rightarrow$ kosmik kema ichidagi vaqt

$2 = t_0\sqrt{1 - \frac{21}{25}}$

$t_0\cdot\frac{2}{5} = 2$ $\quad t_0 = 5$ yil.

$t_y = 20 + 5 = 25$ yosh ④

29) ④

30) $2mc^2 = m_0c^2$

$mc = \frac{m_0c}{2} = \frac{9,1\cdot 10^{-31}\cdot 3\cdot 10^8}{2} = 1,365\cdot 10^{-22}$ kg·m/s ④

7-variant

1) $\vartheta_0 = 20$ m/s
$l = 50$ m.
$t = ?$

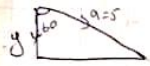
$l = \frac{\vartheta_0^2}{2a}$. $\quad a = \frac{400}{2\cdot 50} = 4$.

$t = \frac{\vartheta_0}{a} = 5s$. ④

2) $a = 4$, $\vartheta_0 = 3$
$\vartheta_{0z} = ?$

$\vartheta = \frac{\vartheta_0 + \frac{a}{2}(2n-1)}{1} = 3 + \frac{4}{2}(2\cdot 5 - 1) = 13$ m/s ②

3) $\alpha = 30^\circ$.
$a = 5 m/s^2$
$m = 2 kg$
$F_{og}, F_{nat} = ?$



$a_{nis} = \sqrt{5^2 + 10^2 - 2\cdot 5\cdot 10\cdot\frac{1}{2}} = 5\sqrt{3}$

$F_{og} = m\cdot a_{nis} = 10\sqrt{3}$

$F_{nat} = m\cdot a = 10$. ⑧

4) 

$T = ?$

$\mu = 0,3$

$T + F_{ish} = F$

$T = 9 - 0,5 \cdot 20 = 3$ (B)

5) $a = 4 m/s^2$

$k = 100 N/m$

$\Delta x = 0,06 m$

$m = ?$

$m(g-a) = k\Delta x$

$m = \frac{100 \cdot 0,06}{6} = 1 kg$ (C)

6) 

$F_{nat} = ?$

F_{nat} (↓) (A)

7) $k = 20 kg/s$

$l = 15 m$

$\Delta P = ?$

$F_q = 20\vartheta$

$\frac{m\vartheta_0^2}{2} - \frac{m\vartheta^2}{2} = \frac{20(\vartheta + \vartheta_0)}{2}$

$m\Delta\vartheta = 300$ (B)

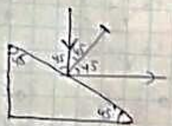
8) $h = 1,25 m$

$\alpha = 45°$

$t = 0,1 s$

$m = 2 kg$

$F = ?$



$2m\vartheta \cos 45 = F \cdot t$

$F = 10\sqrt{2} \cdot 10 = 100\sqrt{2} = 141$ (A)

9) $m_1 = 4 g$

$m_2 = 6 g$

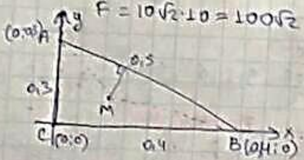
$m_3 = 10 g$

$AB = 50 sm$

$BC = 40 sm$

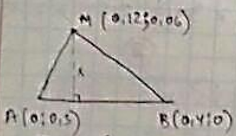
$AC = 30 sm$

$x = ?$



$x' = \frac{0 + 0,4 \cdot 6}{20} = \frac{2,4}{20} = \frac{0,24}{2} = 0,12$

$y' = \frac{0,3 \cdot 4}{20} = \frac{0,12}{2} = 0,06$



$x = 10 sm$ (C)

10) $\nu = 1 mol$

$M = 63,5 \cdot 10^{-3} kg/mol$

$c = 380 J/kg \cdot K$

$C_m = ?$

$C_m = c\nu M = 1 \cdot 380 \cdot 63,5 \cdot 10^{-3} = 2,9R$ (D)

11) $A = 21 kJ$ $T_3 = T_1$

$\Delta U = ?$

(D)

$\Delta U = \frac{3}{2}\nu R(T_3 - T_1) = 0$

12) (D)

13) $S = 10^{-3} m^2$

$R = 6400 km$

$\frac{\rho}{\varepsilon_0} = 1,8 \cdot 10^{-8} C \cdot m/F$

$E = ?$

$E = \frac{kq}{(R+h)^2} = \frac{\frac{1}{4\pi\varepsilon_0} \cdot q}{(R+h)^2}$

$10 \cdot 10^{-4} \longrightarrow \rho$

$4\pi(R+h)^2 \text{ --- } q_x$

$q_x = \frac{\rho \cdot 4\pi(R+h)^2}{10^{-3}}$

$E = \frac{\frac{1}{4\pi\varepsilon_0} \cdot \rho \cdot 4\pi(R+h)^2 \cdot 10^3}{(R+h)^2} = 18 \cdot 10^{-5} = 180 MV/m$ (B)

14) $m_\alpha = 4m_p$

$\vartheta_1 = \vartheta$

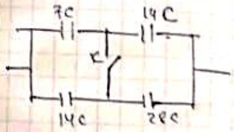
$E_p = ?$

$\frac{m\vartheta^2}{2} = E$

$m\vartheta = m \cdot 0,9\vartheta + 4m \cdot \vartheta_x \Rightarrow \vartheta_x = \frac{\vartheta}{40}$

$E_p = E - E_k = E - \left(\frac{m \cdot (0,9\vartheta)^2}{2} + \frac{4m \cdot (\frac{\vartheta}{40})^2}{2}\right) = 0,19 E$ (C)

15) 3- va 4- kondensatorlar parallel. $\frac{U_3}{U_4} = 1$ (A)

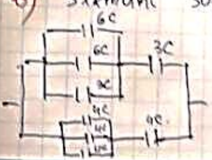
16) 

$\frac{7C}{14C} = \frac{14C}{28C} \Rightarrow$ kalit ulansa ham umumiy sig'im o'zgarmaydi. (A)

17) (A)

18) (D)

19) Sxemani soddalashtiramiz:



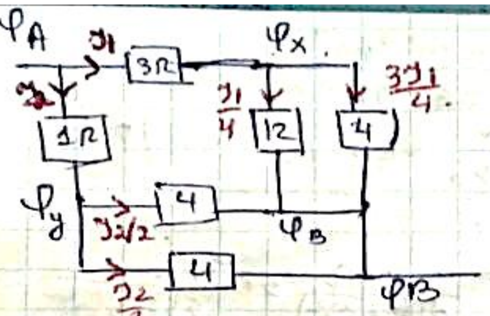
$C_{um_1} = 6C + 6C + 3C = 15C$

$C_{um_2} = \frac{15C \cdot 3C}{15C + 3C} = \frac{45C^2}{18C} = \frac{5C}{2}$

$C_{um_3} = 4C \cdot 3 = 12C$

$C_{um_4} = \frac{12C \cdot 4C}{16C} = 3C$

$\frac{5C}{2} + 3C = \frac{11C}{2}$ (B)

20) 

$R_{um} = ?$

Potensiallaymiz:

$$\begin{cases} \varphi_A - \varphi_x = J_1 \cdot 3 \\ \varphi_A - \varphi_y = J_2 \cdot 1 \\ \varphi_x - \varphi_B = 3J_1 \\ \varphi_y - \varphi_B = 2J_2 \end{cases}$$

$$\begin{cases} \varphi_A - \varphi_B = 6J_1 \\ \varphi_A - \varphi_B = 3J_2 \end{cases} \qquad J_2 = 2J_1$$

$$\varphi_A - \varphi_B = (J_1 + J_2) R_{um}$$

$$R_{um} = \frac{6J_1}{J_1 + 2J_1} = 2R$$ (A)

21) (A)

22) (C)

23) $\vartheta_1 = \vartheta_2$ 1 p 4 2α

$$\frac{R_1}{R_2} = \frac{m_1 \vartheta_1}{q_1 \cdot B} : \frac{q_2 \cdot B}{m_2 \vartheta_2} = \frac{m_1}{m_2} \cdot \frac{q_2}{q_1} = \frac{1}{4} \cdot 2 = \frac{1}{2}$$ (A)

24) (B)

25) $l = 2{,}66\,m$. $n = 1{,}33$

$l_x = ?$

$$l_x = \frac{l}{n} = \frac{2{,}66}{1{,}33} = 2$$ (A)

26) $J_n = J_1 + J_2 = J + \frac{J}{3} = \frac{4J}{3}$ (B)

27) (B)

28) (B)

29) Pauli prinsipidan foydalanamiz:

$x = [2n^2]$

$n = 1$ $x = 2$ta
$n = 2$ $x = 8$ta
$n = 3$ $x = 18$ta
$n = 4$. $x = 30 - (2 + 8 + 18) = 2$ta

(C)

30) $$E = -\left(-\frac{13{,}6}{2^2}\right) = \frac{13{,}6}{4} = 3{,}4\,eV$$ (A)

8- VARIANT

①

x	1,6	1	-1	
t	0,1	0,2	0,3	

$x = x_0 - \ell = x_0 - \left(v_0 t - \frac{a t^2}{2}\right) =$

$= x_0 - v_0 t + \frac{a t^2}{2}$.

$a = ?$

$\begin{cases} 1 = 1{,}6 - v_0 \cdot 0{,}1 + \frac{a \cdot 0{,}1^2}{2} \\ -1 = 1{,}6 - v_0 \cdot 0{,}2 + \frac{a \cdot 0{,}2^2}{2} \end{cases}$

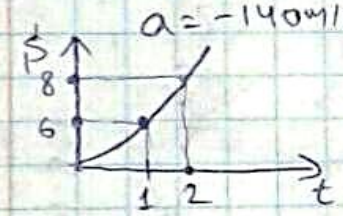
$-\frac{a \cdot 0{,}02}{2} = 1{,}4.$

$-a \cdot 0{,}01 = 1{,}4$

$a = -140\ m/s^2$.

$+ \begin{cases} 0{,}1 v_0 - \frac{a \cdot 0{,}1^2}{2} = 0{,}6. \\ 0{,}2 v_0 - \frac{a \cdot 0{,}2^2}{2} = 2{,}6 \end{cases} \Big| \cdot (-2)$

②



$v_0 = ?$

(A) $S = v_0 t + \frac{a t^2}{2}$.

$\begin{cases} 6 = v_0 + \frac{a}{2}. \\ 8 = 2v_0 + 2a \end{cases}$ $\begin{cases} v_0 + \frac{a}{2} = 6. \\ v_0 + a = 4. \end{cases}$

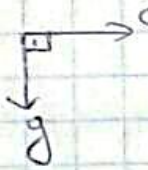
$\frac{a}{2} = -2.$ $a = -4.$

④ $v_0 = 8\ m/s$.

③ $a = \sqrt{21}\ m/s^2$

$m = 80\ kg$.

$F_{og} = ?$ $F_n = ?$



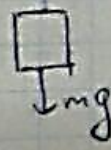
$a_{wis} = \sqrt{a^2 + g^2} = 11\ m/s$

$F_{og} = m \cdot a_{wis} = 880\ N$.

$F_n = ma = 80\sqrt{21}$.

⑤

④



$\ell = 20\ m$

$\rho = 7900\ kg/m^3$

$E = 2 \cdot 10^{11}\ Pa$.

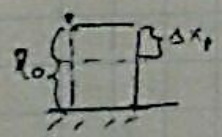
$g = 10\ m/s^2$

$\Delta \ell = ?$

$k \Delta x = \frac{mg}{2}$.

$\Delta x' = \frac{mg}{2k}$.

$\boxed{\ell + \ell_0 = \frac{mg}{2k}}$

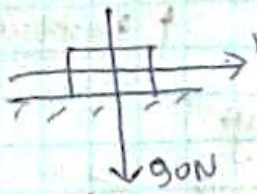


$k \Delta x_1 = \frac{mg}{2}$

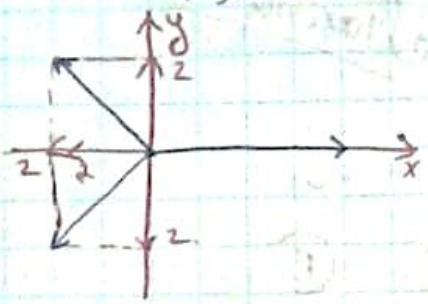
$\boxed{\ell_0 - \ell = \frac{mg}{2k}}$

8-variant

Abdallayeva Makina

⑤ 

$F_n = 120N$ (A)

⑥ 

$m = 1kg$
$a = ?$

$OX: F_n = 4 - (2+2) = 0$
$OY: F_n = 2 - 2 = 0$
$F_n = 0$
$F_n = ma = 0$ (B)
$a = 0$

⑦ $N = k\vartheta^2$
$0,64N = k\vartheta_x^2$
$\vartheta_x = 0,8\vartheta$
20% ↓ (A)

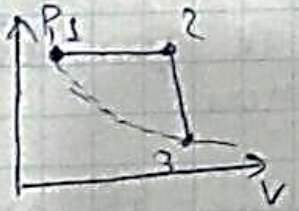
⑧ $a < g$.
$h = \frac{2\delta}{\rho(g+a)2}$
kamayadi. (A)

⑨ $P_1 - P_2 = \frac{\rho\vartheta^2}{2}$
$\vartheta = \sqrt{\frac{2(P_1-P_2)}{\rho}}$ (A)

⑩ $i_i - i_a = 0$. $i_i = i_a$
$i = 6$.
$i_i + i_a = 6$. $i_i = i_a = 3$.
$\frac{Q_1}{Q_2} = \frac{\frac{6}{2}\vartheta R\Delta T}{\frac{6}{2}\vartheta R\Delta T} = 1$ (B)

⑪ ⑫

⑫ $S = 10^{-3} m^2$
$\varphi = \frac{kq}{R} = \frac{\frac{1}{4\pi\varepsilon_0}\cdot q}{R} = \frac{4\pi\cdot(64\cdot10^5)^2}{10^{-3}} \cdot \frac{1,8\cdot10^{-8}}{4\pi\cdot64\cdot10^5} = 115V$ (A)

⑬ 

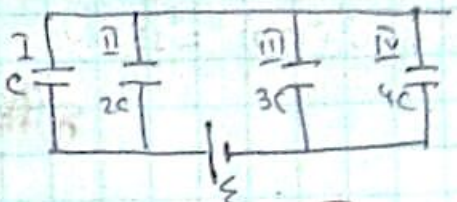
$Q_1 = 10J$.
$\Delta U_2 = ?$

$Q_1 = \frac{5}{2}\vartheta R(T_2 - T_1) = 10$
$\vartheta R(T_1 - T_2) = -4$.
$\Delta U_2 = \frac{3}{2}\vartheta R(T_3 - T_2) = \frac{3}{2}(-4) = -6J$
(P)

1 8-variant.

Abdullayeva Yoxina

14) $\frac{q_1}{q_2} = ?$



$\frac{q_1}{q_2} = \frac{C_1 U_1}{C_2 U_2} = \frac{C}{2C} = \frac{1}{2}$. (A)

15) $\vartheta_1 = 80$ km/s.
$m_2 = 4m_1$
$\vartheta_2 = ?$

$m_1\vartheta_1 = -m_1\vartheta_1 + 4m_1 \cdot \vartheta_x$.

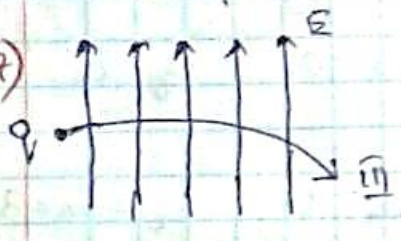
$2m_1\vartheta_1 = 4m_1\vartheta_x$. (B)

$\vartheta_x = \frac{\vartheta_1}{2} = \frac{80}{2} = 40$ km/s.

16) $B = 1$ T
$\vartheta = 15$ m/s.
$E = ?$

$Eq = qB\vartheta$
$E = B\vartheta = 15$ V/m
(A)

17)



$q < 0 \Rightarrow$ Maydon yönalishiga qaramaqarshi kuch ta'siz ketadi (A)

18) $\varphi_1 - \varphi_2 = 6$ V.
$\varphi_1 - \varphi_4 = ?$

$\Delta\varphi = E \cdot l$

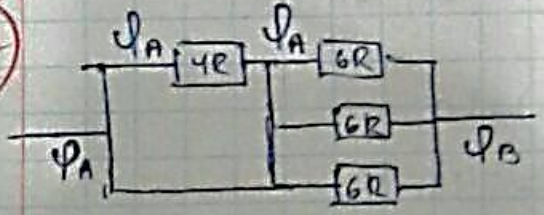
$l \rightarrow$ maydon yönalishidagi ko'chish.

$\begin{cases} 6 = E \cdot 2 \\ \varphi = E \cdot 1 \end{cases}$ $\frac{\varphi}{6} = \frac{1}{2}$ (B)

$\varphi = 3$ V

19) (A) 20) (A)

21)



$R_{um} = ?$

Chizmaga ko'ra 4R qarshilikdan tok o'tmaydi.

$R_{um} = \frac{6R}{3} = 2R$

22) P_1' va d_2^4
$\vartheta_1 = \vartheta_2$
$\frac{T_1}{T_2} = ?$

$\frac{T_1}{T_2} = \frac{2\pi m_1}{q_1 B} \cdot \frac{q_2 B}{2\pi m_2} = \frac{m_1}{m_2} \cdot \frac{q_2}{q_1} =$

$= \frac{1}{4} \cdot 2 = \frac{1}{2}$ (A)

8-variant

(23) $R = 8\pi$.

$x = 8{,}28\ m$.

$x_m = 50 \cdot 10^{-3}\ m$

$a_m = 180\ m/c^2$

$\vartheta = ?$

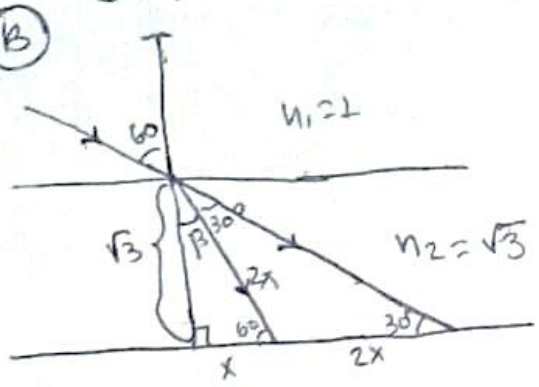
$a_m = x_m \cdot (2\pi\nu)^2$

$\nu = \frac{30}{\pi}$.

$\vartheta = R\nu = 8\pi \cdot \frac{30}{\pi} = 240\ m/c$ (B)

(24) (B)

(25)



$\frac{\sin 60^\circ}{\sin\beta} = \frac{\sqrt{3}}{1}$.

$\sin\beta = \frac{1}{2}$ $\beta = 30^\circ$.

$x\sqrt{3} = \sqrt{3}$

$x = 1\ sm$

(B)

$2x = 2 \cdot 1 = 2\ sm$.

(26) $R = 4 \cdot 10^{-3}\ m$.

$E = 10^6\ W/m^2$

$\varphi = ?$

$\varphi = E \cdot S = E \cdot \pi R^2 = 10^6 \cdot 3{,}14 \cdot 16 \cdot 10^{-6}$

$= 50\ Pm$ (D)

(27) (B)

(28) $\frac{m_0 c^2}{\sqrt{1 - \frac{\vartheta^2}{c^2}}} = 13 m_0 c^2$

$\vartheta = \frac{\sqrt{168}}{13} c$

$P = \frac{m_0 \vartheta}{\sqrt{1 - \frac{\vartheta^2}{c^2}}} = \frac{\frac{\sqrt{168}}{13} m_0 c}{\sqrt{1 - \frac{168}{169}}}$

$= \frac{\sqrt{168}}{13} m_0 c \cdot 13 = \sqrt{168}\, m_0 c$ (D)

(29) $\frac{h\alpha}{R} = mc^2$

$R = \frac{h}{mc} = \frac{6{,}6 \cdot 10^{-34}}{9{,}1 \cdot 10^{-31} \cdot 3 \cdot 10^8} = 72{,}7\ Mm$. (A)

(30) $-\frac{13{,}6}{1^2} + E = -\frac{13{,}6}{3^2}$.

$E = 13{,}6 - \frac{13{,}6}{9} = 12{,}1\ eV$ (D)

Abdullayeva Ulviya

9-VARIANT

① $\vartheta = \frac{2\pi R}{T}\cos\alpha = \frac{40\cdot 10^6}{86400}\cdot\frac{\sqrt{3}}{2} = 401$ m/c (A)

②

t(s)	10	11	12
x(m)	1,6	1	-1

$x = x_0 - \ell = x_0 - (\vartheta_0 t + \frac{at^2}{2})$

$\vartheta_0 t + \frac{at^2}{2} = x_0 - x$.

$\begin{cases} \vartheta_0 + \frac{a}{2} = 0,6 \\ \vartheta_0 + a = 1,3 \end{cases}$ $\frac{a}{2} = 0,7$

$a = 1,4$ m/c^2 $= 140$ sm/c^2

$\begin{cases} \vartheta_0 + \frac{a}{2} = +0,6 \\ 2\vartheta_0 + 2a = 2,6 \end{cases}$

Sericupanwchan harakat bolgani uchun $a = -140$ sm/c^2 (A)

③ $\vartheta = 10$ m/c.
$R = 90$ m
$m = 9\cdot 10^3$ kg /
$F_n = ?$, $F_{og} = ?$

$a = \frac{\vartheta^2}{R} = \frac{100}{90} = \frac{10}{9}$

$F_n = ma = 9\cdot 10^3 \cdot \frac{10}{9} = 10$ kN. (C)

$F_{og} = m\cdot a_{uis} = m\cdot\frac{80}{9} = 9\cdot 10^3\cdot\frac{80}{9} = 80$ kN

④ $\ell = 5$ m.
$S = 2\cdot 10^{-4}$ m^2.
$K = 500$ N/m /
$E = ?$

$K = \frac{ES}{P_0}$ $E = \frac{KP_0}{S} = \frac{500\cdot 5}{2\cdot 10^{-4}} =$

$= 1250\cdot 10^4 = 12,5$ MPa (C)

⑤ (B)

⑥ $m = 3$ kg.
$a = 6$ m/c^2 /
$F_q = ?$

$F_q = m(g-a) = 3(10-6) = 12$ N. (B)

⑦ $F_q = k\upsilon$
$N = k\upsilon^2$.
$N_x = k\cdot(0,80)^2 = 0,64 k\upsilon^2 = 0,64$ N $\longrightarrow$ 36% $\downarrow$ (C)

⑧ G [N/m] (C)

@ziyozigot olami

$g = \frac{Gm}{R^2} \Rightarrow gR = \frac{GM}{R}$.

⑨ $H = 1,5R$.

$\left(-\frac{GmM}{2,5R}\right) = \left(-\frac{GmM}{R}\right) + E_k$.

$E_k = \frac{GmM}{R} - \frac{GmM}{2,5R} = \frac{3}{5}\frac{GmM}{R} = 0,6\,gMR$. (C)

9 - variant

Abdullayeva Maxina @ziyoziyot olami

10) (B) 11) (A) 12) (A)

13) $\varphi_1 = \frac{kq}{1}$

$\frac{kq}{2} + \Delta\varphi = \frac{kq}{1}$

$\frac{kq}{2} - \frac{kq}{2} = \frac{kq}{R}$

$\Delta\varphi = \frac{kq}{2}$

$R = \infty$. (C)

14) $\vartheta_1 = 100$ km/c.

$m_1 = m$.

$m_2 = 4m$.

$\vartheta_2 = ?$

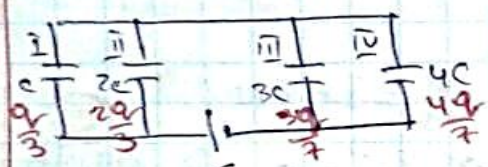
$m_1\vartheta_1 = -m_1\vartheta_1 + 4m_1 \cdot \vartheta_x$

$2m_1\vartheta_1 = 4m_1 \cdot \vartheta_x$. (C)

$\vartheta_x = \frac{\vartheta_1}{2} = \frac{100}{2} = 50$ km/c

15) (B).

16)



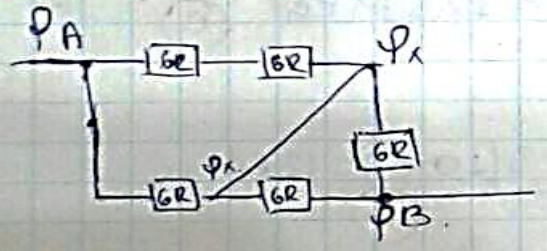
$\frac{q_2}{q_3} = ?$

$\frac{q_2}{q_3} = \frac{2q \cdot 7}{3 \cdot 3q} = \frac{14}{9}$.

(B)

17) (B) 18) (D) 19) (A) 20) (C)

21)



$R_{um} = ?$.

Sxemani soddalashtiramiz:

$R_{um1} = \frac{12R \cdot 6R}{18R} = 4R$. (B)

$R_{um2} = 3R$

$R_{um} = 4R + 3R = 7R$

22) (B)

23) $R = 8\pi$ m.

$x = 106$m.

$x_m = 110 \cdot 10^{-3}$ m.

$a_m = 1331$ m/c^2

$\vartheta = ?$

$a_m = x_m \cdot \omega^2$.

$\omega = \sqrt{\frac{133100}{11}} = 110$ rad/c.

$2\pi D = 110$

$D = \frac{55}{\pi}$

$\vartheta = \pi D = 8\pi \cdot \frac{55}{\pi} = 440$ m/c (B)

24) (D)

9-variant

25) $d=0{,}2m$. $f=0{,}5m$. $D=?$

$D=\frac{1}{d}-\frac{1}{f}=\frac{1}{0{,}2}-\frac{1}{0{,}5}=5-2=3$. (A)

Abdullayeva Maxina @riyoziyot olami

26) 124π.

27) Bulut (B)

28) (D)

29) (A)

30) (C).

10-variant.

1) $\vartheta=10\,m/c$. $R=90\,m$. $m=9\cdot10^3\,kg$. $F_{og}=?$ $F_{nat}=?$

$a=\frac{\vartheta^2}{R}=\frac{100}{90}=\frac{10}{9}\,m/c^2$.

$F_{og}=m(g+a)=9\cdot10^3\left(10+\frac{10}{9}\right)$

$=100\,kN$.

$F_{nat}=ma=9\cdot10^3\cdot\frac{10}{9}=10\,kN$. (D)

2)

t	0	1	2	3
x	1	0	-1	-2

$x=x_0+\vartheta_0t+\frac{at^2}{2}=1+\vartheta_0t+\frac{at^2}{2}$.

$x_0=1$.

$\begin{cases}0=1+\vartheta_0\cdot1+\frac{a}{2}\\-1=1+\vartheta_0\cdot2+2a\\-2=1+\vartheta_0\cdot3+\frac{9a}{2}\end{cases}$

$\begin{cases}\vartheta_0+\frac{a}{2}=-1\\\vartheta_0+a=-1\\\vartheta_0+3\frac{a}{2}=-1\end{cases}\Rightarrow a=0$. (C)

3) $S=\vartheta_0t+\frac{at^2}{2}$.

$\begin{cases}6=\vartheta_0+\frac{a}{2}\\8=2\vartheta_0+2a\end{cases}$

$\begin{cases}\vartheta_0+\frac{a}{2}=6\\\vartheta_0+a=4\end{cases}$

$\frac{a}{2}=-2$

$a=-4$. (C)

10-variant

4) giperbola (B) 5) (C)

6) $m = 3\,kg$, $F_{av} = 24\,N$, $a = ?$

$m(g-a) = 24$.

$a = 2\,m/c^2$ (B)

7) $N = k\vartheta^2$.

$0{,}64N = k\vartheta_x^2$

$\vartheta_x = 0{,}8\vartheta \rightarrow$ 20% kamaydi.

(A)

8) $m = 0{,}3\,kg$.

$\alpha = 30°$.

$l = 0{,}2\,m$.

$\Delta P = 2{,}6\,kg \cdot m/c$

$\vartheta_0 = ?$

$2m\vartheta_0 \cos\alpha = 2{,}6$.

$2 \cdot 0{,}3 \cdot \vartheta_0 \cdot 0{,}87 = 2{,}6$.

$\vartheta_0 = \frac{2{,}6}{0{,}6 \cdot 0{,}87} = 5\,m/c$

(C)

9) $\left(-\frac{GmM}{6R}\right) = \left(-\frac{GmM}{5R}\right) + E_k$

$E_k = \frac{GmM}{5R} - \frac{GmM}{6R} = \frac{GMm}{30R} =$

$= \frac{gmR}{30}$. (D)

$g = \frac{GM}{R^2}$.

$gR = \frac{GM}{R}$.

10) $\frac{\nu_2}{\nu_1} = \frac{\frac{6}{2}\nu RT}{\frac{5}{2}\nu RT} = 1{,}2$. (C)

11) (A) 12) (A)

13) $\varphi_1 = \frac{kq}{1}$, $\varphi_2 = \frac{kq}{2}$ $\Rightarrow$ $\varphi_x = \frac{kq}{1{,}5} = \frac{2kq}{3} = \frac{2\varphi_1\varphi_2}{\varphi_1+\varphi_2}$ (A).

14) $4m \cdot 50 = -4m \cdot 50 + 4m \cdot \vartheta_x$. (B)

$400 = \vartheta_x$.

15) $R_1 = R_2$.

$q_1 = q$.

$q_2 = 3q$

$E_{px} = ?$

$E_1 = \frac{3kq^2}{R}$

$q_n = \frac{q+3q}{2} = 2q$.

$E_2 = \frac{4kq^2}{R^2}$.

$\frac{E_2}{E_1} = \frac{4}{3}$. (B)

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10-variant

16) C

17) $\frac{J^2 R}{V} = w$. $\quad v = ?$

$w = \frac{J^2 R}{V} = \frac{J^2 \cdot Sl}{S \cdot S \cdot l} = j^2 \rho$.

$j = q_0 n v$.

$w = e^2 n^2 v^2 \rho \Rightarrow v = \frac{1}{ne} \sqrt{\frac{w}{\rho}}$. D

18) $l = 15 - (2+3) = 10\,sm$. $\quad F_{ob} = 2\,sm$, $F_{ok} = 3\,sm$, $l_0 = 25\,sm$

$K_{ob} = \frac{l}{F_{ob}} \cdot \frac{l_0}{F_{ok}} = \frac{10}{2} \cdot \frac{25}{3} = \frac{125}{3}$.

$K_{opt.} = \frac{l}{F_{ob}} \left(\frac{l_0}{F_{ok}} + 1 \right) = \frac{10}{2} \cdot \left(\frac{25}{3} + 1 \right) = 5 \cdot \frac{28}{3} = \frac{140}{3}$. A

19) A

20) A

21) ferromagnit. C $\quad$ 22) B

23) Chastota tezlikka teskari proporsional.

$v \rightarrow$ eng kichik demak chastota eng ↑ bo'lishi kerak $\quad \nu = 1{,}4\,THz$ B.

24) lazer A.

25) $\varphi_1 - \varphi_2 = 6\,V$.
$\varphi_1 - \varphi_3 = ?$

$E \cdot d = \Delta\varphi$.

$d \rightarrow$ maydon yo'nalishidagi ko'chish

$\begin{cases} E \cdot 2 = 6 \\ E \cdot 3 = \varphi \end{cases}$ C $\quad \frac{\varphi}{6} = \frac{3}{2}$. $\varphi = 9\,V$ D

26) $\frac{220\,lm}{2\pi} = 110\,cd$ C

27) O'rtadi B

28) D

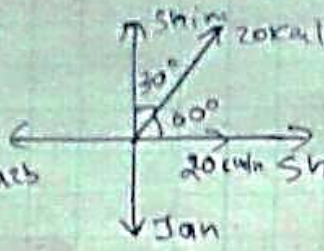
29) Geliy $\rightarrow$ 1 atomli
Vodorod $\rightarrow$ 2 atomli $\quad \frac{E_1}{E_2} = \frac{27 \cdot 10^6}{4{,}7 \cdot 2} = 3 \cdot 10^6$. B

30) $E = -\frac{13{,}6}{3^2} + \frac{13{,}6}{2^2} = 1{,}92\,eV$. C

Abdullayeva Nozima
@ziyoziyot olam

11- Variant

1)



$$\vartheta_{nis} = \sqrt{\vartheta_1^2 + \vartheta_2^2 - 2\vartheta_1\vartheta_2\cos\alpha}$$

$$= \sqrt{20^2 + 20^2 - 2\cdot 20^2 \cdot \frac{1}{2}} = 20 \text{ m/c}.$$

(A)

2) $S = \vartheta_0 t + \frac{at^2}{2}$

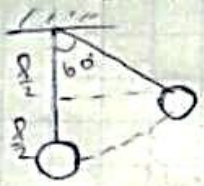
$$\begin{cases} 5 = \vartheta_0 + \frac{a}{2} \\ 8 = 2\vartheta_0 + 2a \end{cases} \qquad \begin{cases} \vartheta_0 + \frac{a}{2} = 5 \\ \vartheta_0 + a = 4 \end{cases}$$

$\frac{a}{2} = -1 \quad a = -2 \text{ m/c}^2$.

$\vartheta_0 = 6 \text{ m/c}$.

$$\frac{S}{t} = \frac{\vartheta_0 t + \frac{at^2}{2}}{t} = \vartheta_0 + \frac{at}{2} = 6 - \frac{2\cdot 3}{2} = 3 \text{ m/c}$$ (D)

3)



$m = 1 \text{ kg}$.

$l = 0{,}6 \text{ m}$.

$F_{og} = ?$ $F_n = ?$

$\frac{mv_m^2}{2} = \frac{mgl}{2}$

$v_m = \sqrt{gl} = \sqrt{6}$.

$a = \frac{v_m^2}{l} = \frac{6}{0{,}6} = 10$.

$F_{og} = m(g+a) = 1\cdot(10+10) = 20 \text{ N}$.

$F_n = m \cdot a_{nis} = 1 \cdot 10\sqrt{3} = 10\sqrt{3} \text{ N}$.

(B)

4) Ellips (A)

5) $a = 1{,}2 \text{ m/c}^2$

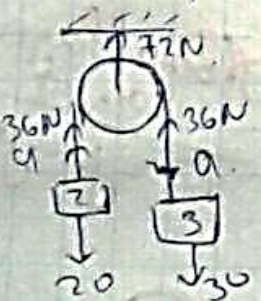
$m = 2{,}5 \text{ kg}$

$F_n = ?$

$F_n = ma = 1{,}2 \cdot 2{,}5 = 3 \text{ N}$.

(B)

6)



$$\begin{cases} 36 - 20 = 2\cdot(a + a_x) \\ 36 - 30 = 3\cdot(a_x - a) \end{cases}$$

$$+\begin{cases} a + a_x = 8 \\ a_x - a = 2 \end{cases} \qquad a_x = 5 \quad a = 3.$$

2-yuk $a_x - a = 2$ formulasi 6-ni yuqoriga harakatlanadi.

(B)

7) $N = k\vartheta^2$.

$N_1 = k \cdot 1^2 = k$.

$N_2 = k \cdot 2^2 = 4k$.

$N_3 = k \cdot 3^2 = 9k$.

$N_1 + N_2 + N_3 = k \cdot \vartheta_h^2$.

$14k = k \cdot \vartheta_h^2$. (B)

$\vartheta_h = \sqrt{14}$ m/s

8) $mgh = \frac{m\vartheta^2}{2} \Rightarrow \vartheta = \sqrt{2gh}$. (C)

9) $\left(-\frac{GmM}{R+h}\right) = E_p$ $\quad g = \frac{GM}{R^2}$

$E_p = \left(-\frac{GmM}{3R}\right) = -\frac{mgR}{3}$.

$E_K = \frac{m\vartheta^2}{2} = \frac{m}{2} \cdot \frac{GM}{R+h} = \frac{E_p}{2} = +\frac{mgR}{6}$.

$E_T = E_K + E_p = -\frac{mgR}{3} + \frac{mgR}{6} = -\frac{mgR}{6}$ (D)

10) $i_i - i_a = 0 \Rightarrow i = 6$.

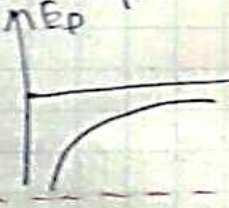
$\frac{6}{2} \cancel{\vartheta} R \cancel{\Delta t} = c \cancel{\vartheta} \Delta t$ (A)

$c = 3R = 25$

11) (A)

12) (A)

13) $E_p = -\frac{2kq^2}{R}$.



(B)

14) $E = \frac{m\vartheta^2}{2}$.

$m\vartheta = 0 + 4m\vartheta_x$. (C)

$\vartheta_x = \frac{\vartheta}{4}$. $E_{Kx} = \frac{4m \cdot \vartheta^2}{16 \cdot 2} = \frac{E}{4}$

15) $q_1 = q_2 = 2 \cdot 10^{-9}$ C.

$R_1 = 2 \cdot 10^{-2}$ m.

$R_2 = 4 \cdot 10^{-2}$ m.

$\frac{E_{p2}}{E_{p1}} = ?$

$E_{p1} = \frac{k \cdot 4 \cdot 10^{-18}}{R}$.

$\frac{kq_1}{2} = \frac{kq_2}{4} \Rightarrow \boxed{q_2 = 2q_1}$

$q_2 + q_1 = 4 \cdot 10^{-9}$.

$q_1 = \frac{4}{3} \cdot 10^{-9}$, $q_2 = \frac{8}{3} \cdot 10^{-9}$ C

$E_{p2} = \frac{k \cdot \frac{32}{9} \cdot 10^{-18}}{R}$.

$\frac{E_{p2}}{E_{p1}} = \frac{32}{9 \cdot 4} = \frac{8}{9}$. (B)

16) (A)

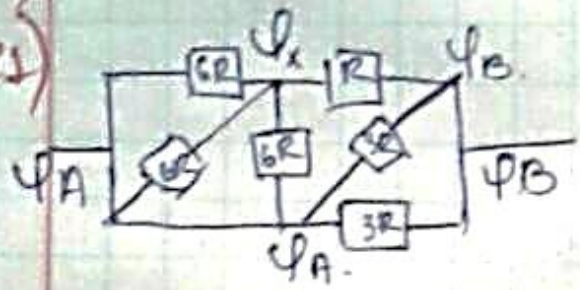
17) $\varphi_1 - \varphi_2 = 6V$.
$\varphi_3 - \varphi_4 = ?$

$E = \frac{U}{d} \Rightarrow \boxed{\Delta\varphi = E \cdot d}$

$\left.\begin{matrix} 6 = E \cdot 2 \\ \varphi = E \cdot 2 \end{matrix}\right] \Rightarrow \varphi = 6V$ (D)

18) (A) 19) (D) 20) (B)

21)



22) diod (C)

23) $\frac{U_1}{8} = \frac{I_2}{I_1}$.
$\frac{2}{U_2} = \frac{I_2}{I_1}$

$\frac{U_1}{8} \cdot \frac{U_1}{2} = 1$.

$U_1 = 4V$ (D)

24) (C)

25) $F_{ok} = 10sm$.
$l = 2,1m$.
$K = ?$

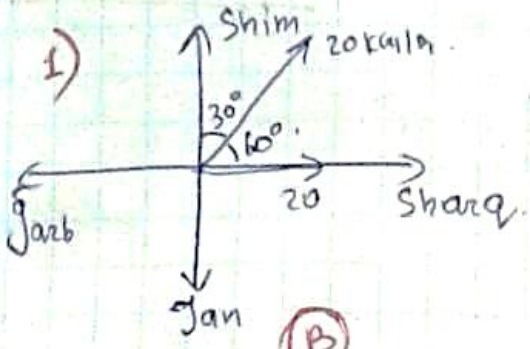
$K = \frac{F_{ob}}{F_{ok}} = \frac{2,1 - 0,1}{0,1} = 20$. (A)

26) $\frac{110\pi}{\pi} = 110\,cd$ (C)

27) (A) 28) (A) 29) (A) 30) (A)

12-variant.

12-variant.

1) 

$\alpha = 30°$ (B)

2) $\alpha = 60°$
$T = 86400s$.
$l = 2\pi R = 40 \cdot 10^6 m$.
$\vartheta = ?$

$\vartheta = \frac{2\pi R}{T} \cos\alpha = \frac{40 \cdot 10^6}{86400} \cdot \frac{1}{2} =$
$= 232 m/c$. (B)

3) $m = 2kg$
$x = 2t + t^2$.
$t = 1s$.
$\vartheta = ?,\ a = ?,\ F = ?$

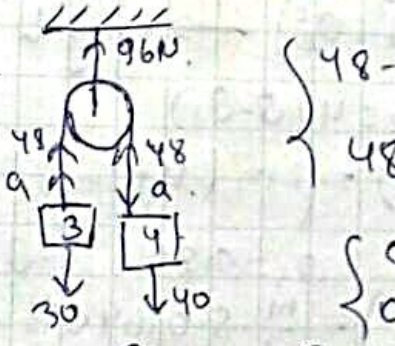
$x' = \vartheta = 2 + 2t = 2 + 2 = 4 m/c$.
$a = \vartheta' = 2 m/c^2$
$F = ma = 4N$.
$x = 2t + t^2 = 2 \cdot 1 + 1 = 3$. (A)

4) Parabola (C)

5) $m_1 = 1kg$
$m_2 = 3kg$
$T = ?$

$T = \frac{2m_1 m_2}{m_1 + m_2} g = \frac{2 \cdot 3 \cdot 1}{4} \cdot 10 = 15N$ (C)

6) $m_1 = 3kg$.
$m_2 = 4kg$
$F = 96$
$a_{1nat} = ?$



$\begin{cases} 48 - 30 = 3(a + a_x) \\ 48 - 40 = 4(a_x - a) \end{cases}$

$\begin{cases} a + a_x = 6. \\ a_x - a = 2 \end{cases}$

$a_{nat_1} = a + a_x = 6$. (B)

7) $\vartheta = 25 m/c$.
$l = 100m$.
$m = 1000kg$
$M = 0,02$
$N = ?$

$F - F_{sur} = ma$
$F = M mg + ma$
$= 0,2 \cdot 1000 + 1000 \cdot \frac{625}{200} = 200 + 3125 = 3325$
5

$N = F \cdot \vartheta = 3325 \cdot 25 = 83 kW$ (B)

12-variant

8) $\frac{m\vartheta^2}{2} = \frac{mgh}{2}$

$\vartheta = \sqrt{gh}$ (B)

9) $E_p = \left(-\frac{GmM}{R+4}\right) = \left(-\frac{GmM}{1,1R}\right) = -\frac{gRm}{1,1}$ (C)

$g = \frac{GM}{R^2}$

$gR = \frac{GM}{R}$

10) $C_V \cdot m \cdot \Delta T = \frac{i}{2}\frac{m}{M} R \Delta T$ $\quad C_p \cdot m \Delta T = \left(\frac{i}{2}+1\right)\frac{m}{M} R \Delta T$

$C_V = \frac{i}{2}\cdot\frac{R}{M}$ $\quad C_p = \left(\frac{i}{2}+1\right)\left(\frac{R}{M}\right)$

3 atomli gaz u-n $C_p = \frac{4R}{M}$ (C)

11) (A) 12) (B) 13) $E_p = \frac{k \cdot q \cdot 3q}{R}$ ya'ni $E_p \sim \frac{1}{R}$.

$r \longrightarrow$ ortsa, $E_p \longrightarrow$ kamayadi

(C)

14) $E = \frac{4m\vartheta^2}{2}$

$4m\vartheta = 4m\vartheta_1 + m\vartheta_2$.

$E_k = \frac{4m\vartheta_1^2}{2} + \frac{m\vartheta_2^2}{2} = \frac{m}{2}(4\vartheta_1^2 + \vartheta_2^2) \longrightarrow$ eng ↓

$4\vartheta = 4\vartheta_1 + \vartheta_2$ $\quad \vartheta_2 = 4(\vartheta - \vartheta_1)$

$E_k = 4\frac{m}{2}\cdot(\vartheta_1^2 + 4(\vartheta-\vartheta_1)^2) = \left(2m(4\vartheta^2 - 8\vartheta_1\vartheta + 5\vartheta_1^2)\right)' = 0.$

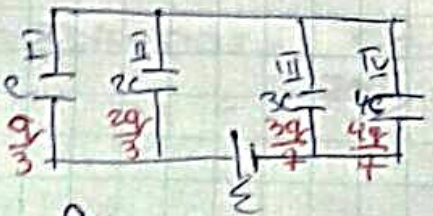
$2m(-8\vartheta + 10\vartheta_1) = 0.$ $\quad \vartheta_1 = 0{,}8\vartheta$ $\quad \vartheta_2 = 0{,}8\vartheta$ (C)

$E_k = \frac{m}{2}(4\cdot 0{,}64\vartheta^2 + 0{,}64\vartheta^2) = \frac{m}{2}\cdot 5\cdot 0{,}64\vartheta^2 = 1{,}6m\vartheta^2 = 0{,}8E$

15) (A)

16) $y = x+1$ (A)

17) $\vartheta_n = \vartheta_1 - 2\vartheta_2$ (C)

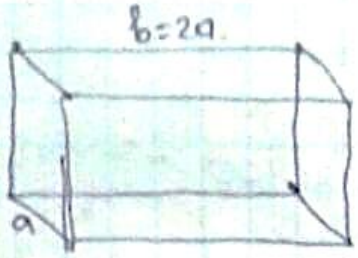
18) 

$\frac{q_1}{q_4} = ?$

$\frac{q_1}{q_4} = \frac{q\cdot 7}{3\cdot 4q} = \frac{7}{12}$

(B)

12-variant

19) 

$\frac{R_1}{R_2} = \frac{\rho \cdot b}{a^2} \cdot \frac{a^2}{\rho a} = \left(\frac{b}{a}\right)^2 = 4$ (B)

20) $\mathcal{E} = 5V$, $r = 4\Omega$ / $I = ?$

$I = \frac{\mathcal{E}}{2} = \frac{5}{4} = 1{,}25A$ (B)

21) tranzistor (C)

22) $R_1 = \frac{R}{2}$, $R_2 = R$ ⇒ 2 marta ↑ (B)

23) $U = \sqrt{U_1 U_2} = \sqrt{17{,}5 \cdot 2} = 6$ (C)

24) kogerent (C)

25) $K = 12$, $l = 22 \cdot 10^{-2} m$ / $F_{ob} = ?$ $F_{ok} = ?$

$\begin{cases} \frac{F_{ob}}{F_{ok}} = 12 \\ F_{ob} - F_{ok} = 22 \cdot 10^{-2} \end{cases} \Rightarrow F_{ob} = 24sm,\ F_{ok} = 2sm$ (A)

26) $\frac{120\pi}{\frac{3}{4} \cdot 4\pi} = 40 cd$ (D)

27) $\frac{hc}{\lambda} = A \Rightarrow \lambda = \frac{hc}{A}$ (D)

28) (A) 29) (A)

30) $-\frac{13{,}6}{3^2} + E = -13{,}6$.

$E = -13{,}6 + \frac{13{,}6}{9} < 0 \Rightarrow$ yutmoydi. (B)

Abdullayeva Maxina

13-variant

1) $\alpha = 0°$

$l = 2\pi R = 40 \cdot 10^6 m$

$T = 86400 s$

$v = ?$

$v = \frac{2\pi R}{T} \cos 0° = \frac{40 \cdot 10^6}{86400} \cdot 1 = 4,63 \text{ m/s}$ (C)

2) $\frac{F_1}{F_2} = \frac{k v_1}{k v_2} = \frac{v}{2v} = \frac{1}{2}$ (A)

3)

t	0,3	0,4	0,5
x	0	-1	1

$a = ?$

$x = x_0 - l = x_0 - \left(v_0 t - \frac{at^2}{2}\right)$

$x_0 = 0.$

$\begin{cases} -1 = 0 - \left(0,1 v_0 - \frac{a \cdot 0,1^2}{2}\right) \\ 1 = 0 - \left(0,2 v_0 - \frac{a \cdot 0,2^2}{2}\right) \end{cases}$

$\begin{cases} 0,1 v_0 - \frac{a \cdot 0,1^2}{2} = 1 \\ 0,2 v_0 - \frac{a \cdot 0,2^2}{2} = -1 \end{cases} \Big| -2$

$a \cdot 0,1^2 - \frac{0,04a}{2} = -3$ (D)

$-0,01a = 3. \quad a = 300$

4) $v_{yer} = \frac{2\pi R}{T} = \frac{2\pi \cdot 6400 \cdot 10^3}{86400} = 0,465 \text{ km/s}$

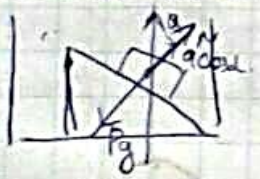
$v_n = v_{yer} + v_{kema} = 0,465 + 11,6 = 12 \text{ km/s}$

$v_n = 12 \text{ km/s} \longrightarrow$ bu 2-kosmik tezlikdan kichik.

(A)

Demak kosmik kema quyosh sistemasini tark etadi

5)



$m = 6 kg$

$a = 3 m/s^2$

$\alpha = 45°$

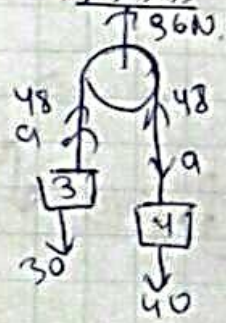
$N_2 = ?$

$N - P_g = ma\cos\alpha$

$N = mg\cos\alpha + ma\cos\alpha =$

$= 6 \cdot \frac{1}{\sqrt{2}} \cdot 12,8 = 54,6.$ (A)

6) $m_1 = 3 kg \quad m_2 = 4 kg \quad F = 96 N.$



$\begin{cases} 48 - 30 = 3(a + a_x) \\ 48 - 40 = 4(a_x - a) \end{cases}$

$\begin{cases} a + a_x = 6. \\ a_x - a = 2 \end{cases}$

(B)

13-variant

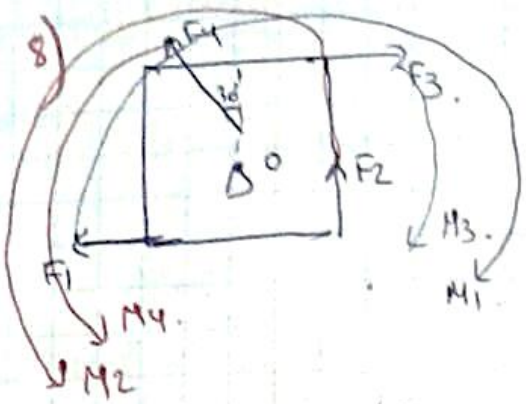
7) $\frac{\delta\vartheta^2}{2} = \delta g h$

$\vartheta = \sqrt{2gh}$

$V = S \cdot \vartheta \cdot t = S t \sqrt{2gh}$

(C)

8)



$M_n = (M_1 + M_3) - (M_2 + M_4) =$

$= F_1 l_1 + F_3 l_3 - F_2 l_2 - F_4 l_4 =$

$= 1 \cdot \frac{a}{2} + 3 \cdot \frac{a}{2} - 2 \cdot \frac{a}{2} - 4 \cdot \frac{a}{8} = \frac{a}{2} =$

$= 0{,}4$ (C)

9) (A) 10) (A)

11) $c = \frac{3R}{27 \cdot 10^{-3}} = \frac{10^3 R}{9} = 923$ (C)

12) (A) 13) (C)

14) $\frac{4m\vartheta^2}{2} = E$

$4m\vartheta = m \cdot 0{,}12\vartheta + 4m \cdot \vartheta_x$. $\vartheta_x = 0{,}95\vartheta$.

$E_p = \frac{4m\vartheta^2}{2} - \left(\frac{m \cdot (0{,}12\vartheta)^2}{2} + \frac{4m \cdot (0{,}95\vartheta)^2}{2} \right) = \frac{4m\vartheta^2}{2} - \frac{3{,}65m\vartheta^2}{2} =$

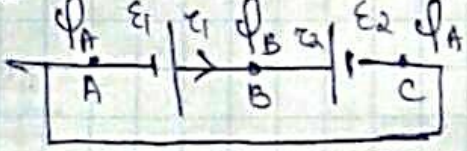
$= \frac{0{,}35m\vartheta^2}{2} = 0{,}088E$ (A)

15) $\frac{m\vartheta^2}{2} = \frac{4m\vartheta_x^2}{2}$ $\vartheta_x = \frac{\vartheta}{2}$ (A)

@ziyoziqot olami Moxina

16) (B) 17) (A)

18)



$\varepsilon_2 = 2V$.

$r_1 = 0{,}25\Omega$

$r_2 = 0{,}5\Omega$

$J = 16A$

$\varphi_B - \varphi_A = ?$

$\begin{cases} \varphi_B - \varphi_A = \varepsilon_1 - J r_1. \\ \varphi_B - \varphi_A = \varepsilon_2 + J r_2. \end{cases}$

$\varphi_B - \varphi_A = 2 + 16 \cdot 0{,}5 = 10.$

(B)

13-variant

19) (A)

20) $l = 0{,}38\ m$
$t = 4 \cdot 10^{-9}\ s$
$v = ?$

$qv = \frac{mv^2}{2}$

$v = \frac{mv^2}{2q} = \frac{9{,}1 \cdot 10^{-31} \cdot \left(\frac{0{,}38}{4 \cdot 10^{-9}}\right)^2}{2 \cdot 1{,}6 \cdot 10^{-19}} = 25664$ (P)

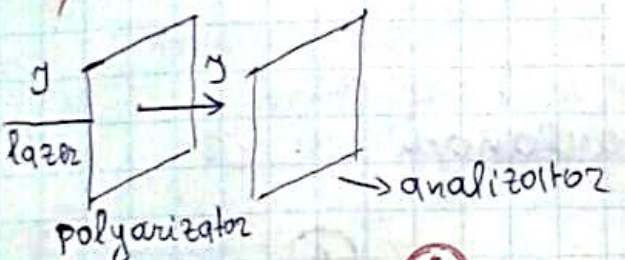
21) $B = NMoH = (x+1)MoH$ (B)

22) $\vartheta_{max} = \ldots \cdot A \cdot \omega$ (A)

23) $C = 2 \cdot 10^{-4}\ F$
$L = 50\ gn$
$T = ?$

$T = \pi\sqrt{LC} = 3\sqrt{100 \cdot 10^{-4}} = 013$ (A)

24) $J = 5 \cdot 10^{16}\ W/m^2$



[0; J] gacha bo'la oladi

1, 2, 3 (B)

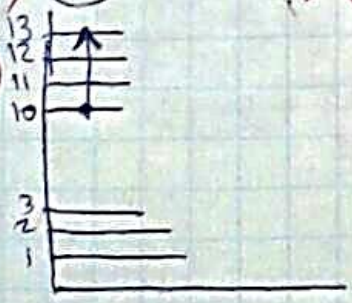
25) $N \cdot K = 900$ (A)

26) $N = 314\ W$
$R = \frac{\pi}{4}\ Sr$
$J = ?$

$J = \frac{N}{R} = \frac{314 \cdot 4}{\pi} = 400\ cd$ (C)

27) (C) 28) (D) 29) (B)

30)



↑ → yutadi (A)

@riyoziyot olami Moxina

14-Variant

1)

x	0	1	2	3	4
t	5	6	8	11	15

$x = v_0 t + \frac{at^2}{2}$

$\begin{cases} 1 = v_0 \cdot 1 + \frac{a \cdot 1^2}{2} \\ 2 = v_0 \cdot 3 + \frac{a \cdot 9}{2} \\ 3 = v_0 \cdot 6 + \frac{a \cdot 36}{2} \\ 4 = v_0 \cdot 10 + \frac{a \cdot 100}{2} \end{cases}$

$-1 = 3a$

$a = -\frac{1}{3}$ m/c²

$1 = v_0 - \frac{1}{6} \Rightarrow v_0 = 1\frac{1}{6}$ m/c

(B) tezlanish ozgarmas.

2)

$\frac{v^2}{20} = 40$

$v = 20\sqrt{2}$.

$l_{K1} = l_{K2} = H$

$\frac{l_{K1}}{l_{K2}} = 1$ (C)

3) $\frac{F_1}{F_2} = \frac{k v^2}{k \cdot (2v)^2} = \frac{1}{4}$ (D)

4) yer garbdan sharqqa aylanadi.

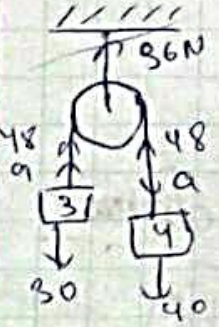
$v_{yer} = \frac{2\pi \cdot 6400 \cdot 10^3}{86400} = 0{,}465$ km/c.

(B)

$v_n = v_2 - v_y = 12{,}7 - 0{,}465 = 12{,}235$ km/c → yerga tushmaydi.

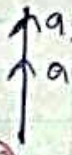
5) $F = \frac{G m_1 m_2}{R^2} = \frac{6{,}67 \cdot 10^{-11} \cdot 160^2}{(3+4+3)^2} = 17{,}1$ nN (A)

6)



$\begin{cases} 48 - 30 = 3(a + a_x) \\ 48 - 40 = 4(a_x - a) \end{cases}$

$\begin{cases} a + a_x = 6 \\ a_x - a = 2 \end{cases}$



$a_{n'i's} = \sqrt{a^2 + a_x^2 - 2aa_x \cos 0^\circ} = a_x - a = 2$ m/c²

(D)

7) (A)

14-variant

8) $P_0 + 2{,}8\cdot10^6 = P_0 + \rho g h$.
$h = \frac{2{,}8\cdot10^6}{1030\cdot9{,}8} = 277\,m$ (B)

9) $P = \frac{2\sigma}{R} + \rho g h \Rightarrow$ eng kichik (B)

10) $C = \frac{Q}{\Delta T} = \frac{Q}{0^\circ} = \infty$ (D)
suv va muz termodinamik muvozanatda. Demak $t = 0^\circ C$

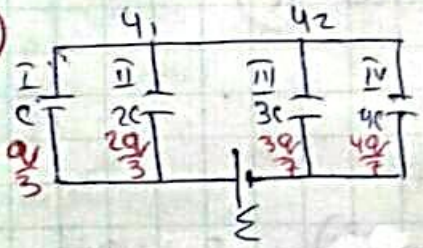
11) $C = \frac{3R}{M} = \frac{3R\cdot10^3}{56} = 445\ J/kg\cdot K$ (C).

12) (A)

13) $P = m_p\cdot\vartheta + 4m_p\cdot\vartheta = 5m_p\vartheta$ (A)

14) $\frac{4m\vartheta^2}{2} = E$

$4m\vartheta = 4m\cdot0{,}95\vartheta + m\cdot\vartheta_x$.
$\vartheta_x = 4\cdot0{,}05\vartheta = 0{,}2\vartheta$ (A)
$E_p = \frac{4m\vartheta^2}{2} - \left(\frac{4m\cdot(0{,}95\vartheta)^2}{2} + \frac{m\cdot(0{,}2\vartheta)^2}{2}\right) = \frac{0{,}35m\vartheta^2}{2} = 0{,}0875E$.

15)


$\frac{W_1+W_2}{W_3+W_4} = ?$

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$\frac{W_1+W_2}{W_3+W_4} = \frac{3C\cdot4_1^2\cdot2}{2\cdot7C\cdot4_2^2} = \frac{3}{7}\cdot\left(\frac{4_1}{4_2}\right)^2 = \frac{3}{7}\cdot\left(\frac{q}{3C}\cdot\frac{7C}{q}\right)^2 = \frac{7}{3}$ (B)

16) $\frac{4m\vartheta^2}{2} = \frac{m\vartheta_x^2}{2}$
$\vartheta_x = 2\vartheta$ (A)

17) $\mathcal{E} = 3{,}5\,V$
$r = 1{,}4\,\Omega$
$P = 3{,}3\,W$
$I - ?$

$I = \frac{3{,}5}{R+0{,}2}$
$I^2R = 3{,}3$
$\left(\frac{3{,}5}{R+0{,}2}\right)^2\cdot R = 3{,}3$
$R = 3{,}3\,\Omega$

$I = \frac{3{,}5}{3{,}3+0{,}2} = 1\,A$.
(A)

18) $E = \int \cdot \rho = q_0 n_0 \rho$ 2) $\vartheta = \frac{E}{q_0 n \rho}$ (A)

19-variant

19) (C)

20) (C) 21) (B) 22) $\vartheta_m = \vartheta + 2WA$ (C)

23) $C = 120 \cdot 10^{-6} F$, $L_1 = 30 \mu H$, $T' = ?$

$T = 6\sqrt{LC} = 3\sqrt{3600 \cdot 10^{-6}} = 180 \cdot 10^{-3}$ (A)

24) (D)

25) $N \cdot K = 400 \cdot 2 = 800$ (A)

26) $R = 0{,}25\,m$, $\Phi = 0{,}314\,lm$, $E = ?$

$E = \frac{\Phi_1}{\pi R^2} = \frac{0{,}314}{\pi \cdot \frac{1}{16}} = 1{,}6$ (B)

27) $\gamma \sim N$ (C) 28) (B)

29) $t = 72{,}9$ sutca, $T = ?$

$t = \pi \cdot 1{,}44$

$T = \frac{72{,}9}{1{,}44} = 50{,}6$ sutca (C)

30) $-\frac{13{,}6}{2^2} + 13{,}6 = 10{,}2\,eV$ (C)

15-variant.

1)

t	1	1,1	1,2
x	0	-2	1

$x = x_0 - s = x_0 - \left(\vartheta_0 t - \frac{a t^2}{2}\right) = -\vartheta_0 t + \frac{a t^2}{2}$

$x_0 = 0$

$$\begin{cases} -2 = -\vartheta_0 \cdot 0{,}1 + \frac{a \cdot 0{,}1^2}{2} \\ 1 = -\vartheta_0 \cdot 0{,}2 + \frac{a \cdot 0{,}2^2}{2} \end{cases} \quad \Big| \cdot (-2)$$

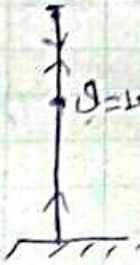
$+$

$5 = \frac{a \cdot 0{,}04 - a \cdot 0{,}02}{2} =$

$= 0{,}01\,a$

$a = 500\,m/c^2$ (B)

2) $t = 1s$, $\vartheta_0 = 30\,m/c$, $\frac{h_1}{h_2} = ?$



$\frac{gt^2}{2} + 10t - \frac{gt^2}{2} = 45.$

$t = 4{,}5\,s$

$5t^2 = 5 \cdot \frac{1}{4} = 1{,}25$

$\frac{h_1}{h_2} = \frac{45 + 1{,}25}{45 - 1{,}25} = 1{,}05$ (A)

15-variant

3) $\begin{cases} F_1 = k\vartheta_1 \\ F_2 = k\vartheta_2 \end{cases}$

$\frac{F_2}{F_1} = \frac{\vartheta_2}{\vartheta_1} \Rightarrow F_2 = F_1\frac{\vartheta_2}{\vartheta_1}$ (D)

4) $F = \frac{GM_1M_2}{R^2} = \frac{6{,}67\cdot10^{-11}\cdot100^2}{(3+4+3)^2} = 6{,}67\ nN$ (D)

5) $\vartheta_{kemas} = 7{,}6\ km/s.$

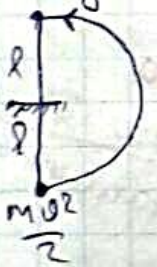
$\vartheta_{yer} = \frac{2\pi R}{T}\cos60^\circ = \frac{\pi R}{T} = \frac{\pi\cdot6400\cdot10^3}{6400} = 0{,}23\ km/s$

$\vartheta = \vartheta_{kemas} + \vartheta_{yer} = 7{,}18\ km/s \longrightarrow$ I kosmik tezlikdan kichik qaytib tushadi. (A)

6) $M = 0{,}1\vartheta.$
$R = 400m.$
$\vartheta_m = ?$

$a = Mg.$
$\frac{\vartheta^2}{R} = Mg \Rightarrow \vartheta = \sqrt{MgR} = \sqrt{3\cdot400} = 34{,}6$ (D)

7) (A) $mg\cdot2l.$

8) 

$\frac{mv^2}{2} = 2mgl$

$v = 2\sqrt{gl}$ (A)

9) (A)

10) (D)

Maxina bukovo

11) $E_{P_1} = \frac{k\cdot16}{R}.$

$q_1' = q_2'$

$\frac{k\cdot q_1'}{4} = \frac{k\cdot q_2'}{6}$

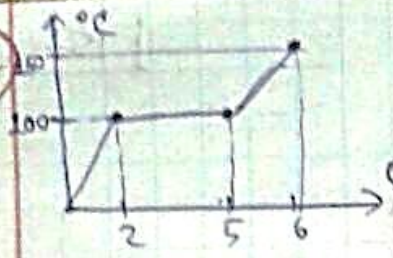
$q_2' = \frac{3}{2}q_1'$

$\frac{3}{2}q_1' + q_1' = 8.$

$q_1' = \frac{16}{5} = 3{,}2 \quad q_2' = 4{,}8.$

$E_{P_2} = \frac{k\cdot3{,}2\cdot4{,}8}{R}$

$\frac{E_{P_2}}{E_{P_1}} = \frac{k\cdot3{,}2\cdot4{,}8}{R}\cdot\frac{R}{16k} = \frac{24}{25}.$ (B)

12) 

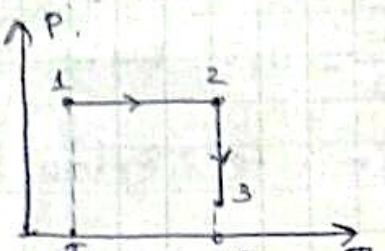
$m = 1\ кг$

$c = ?,\ R = ?$

$c = \frac{Q}{m\Delta T} = \frac{2\cdot 10^6}{1\cdot 100} = 20\ кДж/кг\cdot К$

$R = \frac{Q}{m} = \frac{3\cdot 10^6}{1} = 3\ МДж/кг$

(A)

13) 

$T_0 = 30К$.

$Q_T = 700Дж$.

$\frac{A}{Q} = ?$

$\frac{V_1}{30} = \frac{V_2}{90}$

$V_2 = 3V_1$.

$\frac{A}{Q} = \frac{\vartheta RT + \vartheta RT \ln\frac{V_2}{V_1}}{\vartheta RT\cdot\frac{5}{2} + \vartheta RT \ln\frac{V_2}{V_1}} =$

$= \frac{1+\ln 3}{2{,}5+\ln 3} = 0{,}53$. (C)

14) $P = 0{,}5 m_p \vartheta + 4 m_p \vartheta = 4{,}5 m_p \vartheta$. (D)

15) $\begin{cases} 4m\vartheta - m\vartheta = 4m\vartheta_1 + m\vartheta_2 \\ 4\frac{m\vartheta^2}{2} + \frac{m\vartheta^2}{2} = \frac{4m\vartheta_1^2}{2} + \frac{m\vartheta_2^2}{2} \end{cases}$

$\vartheta_2 = ?$

$\begin{cases} 4\vartheta_1 + \vartheta_2 = 3\vartheta \\ 4\vartheta_1^2 + \vartheta_2^2 = 5\vartheta^2 \end{cases}$ $\quad \vartheta_2 = 3\vartheta - 4\vartheta_1$.

$4\vartheta_1^2 + 9\vartheta^2 + 16\vartheta_1^2 - 24\vartheta\vartheta_1 - 5\vartheta^2 = 0$.

$20\vartheta_1^2 - 24\vartheta_1\vartheta + 4\vartheta^2 = 0$.

$5\vartheta_1^2 - 6\vartheta_1\vartheta + \vartheta^2 = 0$.

$\vartheta_1 = \vartheta$ $\quad \vartheta_1 = \frac{\vartheta}{5}$. $\quad \vartheta_2 = 3\vartheta - 4\cdot\frac{\vartheta}{5} = 2{,}2\vartheta$

(D)

Moxina Вихого 15-variant

16) $\begin{cases} \frac{m\cdot(\vartheta\sqrt{5})^2}{2} = \frac{k\cdot q_1 q_2}{d} \\ \frac{m\vartheta_1^2}{2} + 4\frac{m\vartheta_2^2}{2} = \frac{kq_1q_2}{d} \end{cases}$

$\frac{m}{2}(\vartheta_1^2 + 4\vartheta_2^2) = \frac{m}{2}\cdot(5\vartheta^2)$

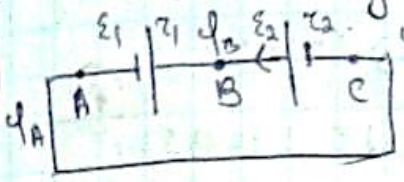
$\vartheta_1^2 + 4\vartheta_2^2 = 5\vartheta^2$ $\quad \vartheta_1 = -2\vartheta$. $\quad \vartheta_2 = 0{,}5\vartheta$.

(B)

15-variant

17) $E = j \cdot \rho \Rightarrow \rho = \frac{E}{j}$ ②

18)



$\varphi_C = \varphi_A$.

$\varepsilon_1 = 2\,V$.
$r_1 = 0{,}125\,\Omega$.
$r_2 = 0{,}15\,\Omega$.
$J = 16\,A$
$\varphi_B - \varphi_C = ?$

$$\begin{cases} \varphi_B - \varphi_A = \varepsilon_2 - J \cdot r_2 \\ \varphi_B - \varphi_A = \varepsilon_1 + J r_1 = 2 + 16 \cdot 0{,}25 = 6\,V \end{cases}$$

②

19) (A) 20) A 21) (C)

22) $a = A \cdot \omega^2$
$\vartheta_m = ?$

$\omega = \sqrt{\frac{a}{A}}$

$\vartheta_m = A \cdot \omega = \sqrt{Aa}$ (B)

23) $C = 125 \cdot 10^{-6}\,F$.
$L = 20\,mH$.
$T = ?$

$T = \pi\sqrt{LC} = 3 \cdot \sqrt{2500 \cdot 10^{-6}} = 150 \cdot 10^{-3}$ ③

24) $9{,}5 \cdot 10^{15}\,m$ (C)

25) (A)

26) $J = 20\,cd$
$R = 0{,}1\,m$.
$E_{max} = ?$

$E = \frac{J \cos\alpha}{R^2}$
$\cos\alpha = 1$ da E_{max} bolaodi.
$E_{max} = \frac{J}{R^2} = \frac{20}{10^{-2}} = 2000\,lx$ (C)

27) (C) 28) C 29) (C) 30)

$${}^{A}_{Z}Y - {}^{4}_{2}\alpha - {}^{0}_{-2}\beta = {}^{A-4}_{Z-2+2}M = {}^{A-4}_{Z}M$$

(A)

pratonlar soni o'zgarmas

Abdullayeva Maxina
Qiyoziyot olami.

16-VARIANT

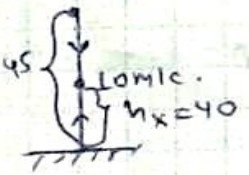
1) $h = 500m$ / $l = ?$

$h = \frac{gt^2}{2} = 5t^2 = 500 \Rightarrow t = 10s.$

$l = \frac{g}{2}(2n-1) = 5(2 \cdot 10 - 1) = 95m$ (A)

2) $\Delta t = 1s.$
$v_0 = 30m/s$ /
$l_2 - l_1 = ?$

$h_{max} = \frac{v_0^2}{20} = 45m.$



$h_x = \frac{30^2 - 10^2}{20} = 40m$

$10t - \frac{gt^2}{2} + \frac{gt^2}{2} = 5 \Rightarrow t = 0,5s.$ (D)

$l_2 - l_1 = (45 + 5 \cdot 0,5^2) - (40 + 5 - 5 \cdot 0,5^2) = 2,5m.$

3) $v_0 = 10m/s.$
$F_q = 20.$
$m = 4kg$ /
$l = ?$

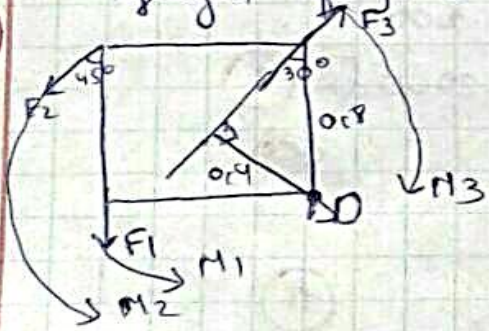
$\frac{mv_0^2}{2} = F_q \cdot l$ (C)

$\frac{4 \cdot 100}{2} = 10 \cdot l \Rightarrow l = \frac{200}{10} = 20m.$

4) $v_{yer} = \frac{2\pi R}{T} \cos 60 = \frac{\pi \cdot 6400 \cdot 10^3}{86400} = 0,23 km/s$

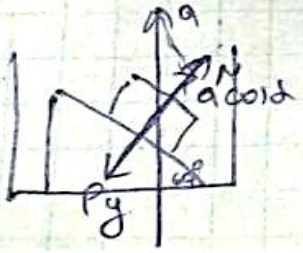
$v_{kema} = 6,6 km/s.$ $v_u = v_y + v_k = 6,83 km/s$

yerga qaytib tushadi. (A)

5) 

$F_1 = 1N.$ $a = 0,8$
$F_2 = \sqrt{2}N$
$F_3 = 2N$ /
$M_n = ?$

$M_n = M_1 + M_2 - M_3 = 1 \cdot 0,8 + \sqrt{2} \cdot 0,8\sqrt{2} - 2 \cdot 0,4 = 1,6$ (D)

6) 

$m = 6kg$
$\alpha = 60°$
$a = 3m/s^2$ /
$N = ?$

$N - mg\cos\alpha = ma\cos\alpha$
$N = m(g+a)\cos\alpha =$
$= 6 \cdot \frac{1}{2} \cdot 13 = 39N.$ (C)

15) $S = 25 \cdot 10^{-4}\ m^2$.
$q = 1{,}77 \cdot 10^{-9}\ C$.
$E = ?$

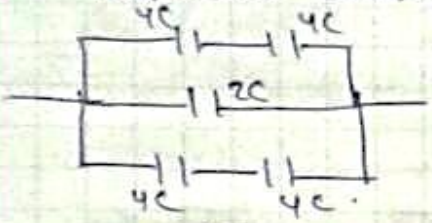
$E = \frac{U}{d} = \frac{q}{cd} = \frac{q}{\varepsilon \varepsilon_0 S} = \frac{1{,}77 \cdot 10^{-9}}{8{,}85 \cdot 10^{-12} \cdot 25 \cdot 10^{-4}}$

$= 8 \cdot 10^4\ V/m$. (D)

16-variant.

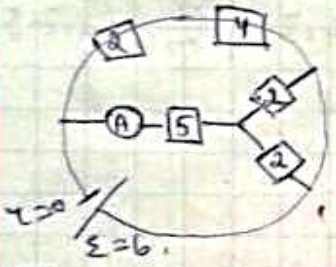
16) $E = J \cdot \rho$ (B)

17) Sxemani soddalashtiramiz:



$C_u = 6C$.
(A)

18)



$R_{um} = \frac{6}{2} = 3R$.

$J = \frac{\varepsilon}{R_{um} + r} = \frac{6}{3} = 2A$. (A)

19) (C) 20) (B)

21) $x_m = 2{,}25sm$.
$l = 1{,}2sm$.
$x = ?$

$x = 4x_m + l = 8{,}8 + 1{,}2 = 10sm$.
(D)

22) (D)

23) $R = 10R$
$C = 8 \cdot 10^{-3}\ F$
$L = 80\ gn$.
$W = 1{,}25\ rad/s$
$\cos\varphi = ?$

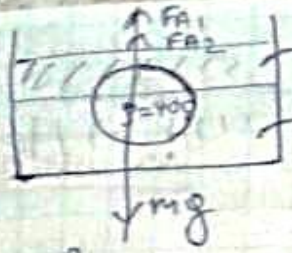
$\cos\varphi = \frac{R}{z} = \frac{10}{\sqrt{10^2 + (100 - 100)^2}} = 1$
(C)

24) (A)

25) (A)

26) $R = \pi \cdot 10^6\ sz$.
$N = 10^3\ W$.

$y = \frac{N}{R} = \frac{10^3}{\pi \cdot 10^6} = 0{,}3\ g\ W/sz$
(A)

7) 

$F_{A_1} + F_{A_2} = mg$.
$300(V - V_1) + 1000 \cdot V_1 = 400V$.

16-variant:

$700V_1 = 100V$.
$V_1 = \frac{V}{7} = 0{,}14V$ (D)

8) $\frac{m\vartheta^2}{2} = mg \cdot 2\ell$
$\vartheta = 2\sqrt{g\ell}$ (A)

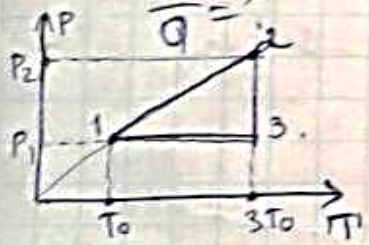
9) Shar (A)

10) $\vartheta_1 = 500$ m/c
$p_x = \frac{p}{1{,}2}$.
$P_x = 1{,}2P$
$\vartheta_x = ?$

$500 = \sqrt{\frac{3P}{\rho}}$
$\vartheta_x = \sqrt{\frac{3 \cdot 1{,}2P \cdot 1{,}2}{\rho}} = 1{,}2 \cdot \sqrt{\frac{3P}{\rho}} = 1{,}2 \cdot 500 = 600$ m/c
(A)

11) (C)
$\nu = 1$ mol

12) $Q_T = 6{,}4$ kJ.
$T_0 = 160K$
$\frac{A}{Q} = ?$



$\frac{P_1}{T_0} = \frac{P_2}{3T_0}$.
$P_2 = 3P_1$.

$A = A_1 + A_2 = \nu R T \ln\frac{V_3}{V_2} + 0 = 6{,}4 \cdot 10^3$
$\ln\frac{V_3}{V_2} = 1{,}6$
$Q = Q_1 + Q_2 = \nu R T \ln\frac{V_3}{V_2} + \frac{3}{2}\nu R T$
$\frac{A}{Q} = \frac{\ln\frac{V_3}{V_2}}{\ln\frac{V_3}{V_2} + 1{,}5} = \frac{1{,}6}{1{,}6 + 1{,}5}$.
$= 0{,}51$
Javob: 0,51

13) $P = 4m\vartheta - 0{,}5m\vartheta = 3{,}5m\vartheta$ (A)

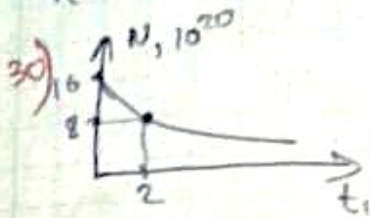
14) $\begin{cases} \frac{m\vartheta^2}{2} + 4\frac{m\vartheta^2}{2} = \frac{m\vartheta_1^2}{2} + 4\frac{m\vartheta_2^2}{2}. \\ 4m\vartheta - m\vartheta = m\vartheta_1 + 4m\vartheta_2 \end{cases}$
$\vartheta_2 = ?$

$\begin{cases} 4\vartheta_2^2 + \vartheta_1^2 = 5\vartheta^2. \\ 4\vartheta_2 + \vartheta_1 = 3\vartheta \end{cases}$
$\vartheta_2 = \frac{3\vartheta - \vartheta_1}{4}$.
$\frac{(3\vartheta - \vartheta_1)^2}{4} + \vartheta_1^2 = 5\vartheta^2$
$\vartheta_1 = \frac{5\vartheta}{11}$. $\vartheta_2 = 0{,}2\vartheta$ (D)

27) C 28) D

16-variant.

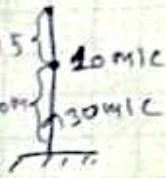
29) Annigilyatsiya - reaksiyada 2 ta 1 xil foton hosil bóladi. $P_1 = P_2$ D

30) 

$T = 2$ sutka.
$t = 6$ sutka.
$N = 16 \cdot 10^{20} \cdot 2^{-3} = 2 \cdot 10^{20}$.
$16 \cdot 10^{20} - 2 \cdot 10^{20} = 14 \cdot 10^{20}$ ta C

17-variant.

1) $\frac{g}{2}(2n-1) = 75$ $\quad h = \frac{gt^2}{2} = 5 \cdot 64 = 320$ m.
$n = 8$. C

2) 

10 m/s
30 m/s

$10t - \frac{gt^2}{2} + \frac{gt^2}{2} = 5$.
$t = 0{,}5$ s.
$\frac{v_1}{v_2} = \frac{gt}{10 - gt} = \frac{5}{5} = 1$ A

3) $m = 100$ kg
$F_q = 8v$
$v_0 = 4$ m/s
$s = ?$

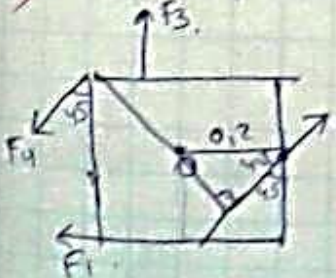
$\frac{mv_0^2}{2} = F_q \cdot s$.
$\frac{100 \cdot 16}{2} = 16 \cdot s \Rightarrow s = 50$ m. B

4) $mg = 5$.
$m(g+a) = 6$
$a = ?$

$m = 0{,}5$.
$g + a = 12$
$a = 2$ m/s² (yuqoriga) D

5) D 6) C

7) $F_1 = 1$ N, $F_2 = 2\sqrt{2}$ N, $F_3 = 2$ N, $F_4 = \sqrt{2}$ N. $a = 0{,}4$ m.



$M = M_2 + M_4 - (M_1 + M_3) = 2\sqrt{2} \cdot \frac{0{,}2}{\sqrt{2}} + \sqrt{2} \cdot 0{,}2\sqrt{2} -$
$- (1 \cdot 0{,}2 + 2 \cdot 0{,}1) = 0{,}4 + 0{,}4 - 0{,}4 = 0{,}4$ N/m.

B

17-variant

8) $m = 10^3$ kg.
$h = 1700 \cdot 10^3$ m.
$M = 6 \cdot 10^{24}$ kg.
$R = 6300 \cdot 10^3$ m.
$E_p = ?$

$E_p = \left(-\frac{GM_1M_2}{R+h}\right) = -50$ GJ (A)

9) $\left(-\frac{GmM}{R}\right) = \left(-\frac{GmM}{R+\frac{R}{n}}\right) + A$

$A = \frac{GmM}{R}\left(1 - \frac{n}{n+1}\right) = \frac{mgR}{n+1}$ (D)

10) $P = \text{const}$

$\frac{V_1}{T_1} = \frac{V_2}{T_2}$. $\frac{V_1}{273} = \frac{1,2V_1}{T_x}$ $\Rightarrow$ $T_x = 273 \cdot 1,2$

$\Delta T = T_x - T_1 = 273 \cdot 0,2 = 54,6$. (A)

11) $A_{ad} = -\frac{3}{2}\vartheta R(T_2 - T_1) = \frac{3}{2}\vartheta R(T_1 - T_2)$

$A_{iz} = \vartheta R(T_3 - T_2) = \vartheta R(T_1 - T_2)$

$\frac{5}{2}\vartheta R\Delta T = A$ $\quad \vartheta R\Delta T = 0,4A$.

$A_{ad} = \frac{3}{2}\vartheta R\Delta T = 1,5 \cdot 0,4A = 0,6A$ (C)

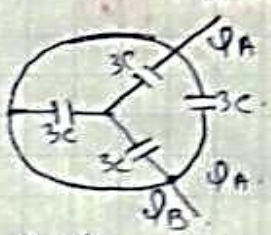
12) $E_p = \frac{k \cdot 2q^2}{R}$.

(A)

13) (B).

14) $m\vartheta - m\vartheta = 2m\vartheta_x$
$\vartheta_x = 0$. (A)

15)



$\varphi_A - \varphi_B = \varphi_A - \varphi_A = 0$.

$C_{um} = 0$ (D)

16) $|G| = 1,77 \cdot 10^{-9}$ C/m²

$R = 5 \cdot 10^{-2}$ m.
$U = ?$

(C)

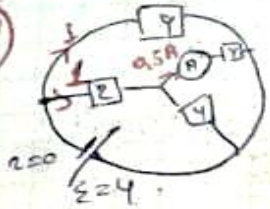
$U = \frac{q}{C} = \frac{q \cdot d}{\varepsilon\varepsilon_0 S} = \frac{1,77 \cdot 10^{-9} \cdot 5 \cdot 10^{-2}}{8,85 \cdot 10^{-12}} = 10$ V

17) $E = j \cdot \rho \Rightarrow \rho = \frac{E}{j}$ (D)

17-variant

18) (C) 19) (B)

20)



$I = \frac{\varepsilon}{R+r} = \frac{4}{2} = 2A$

$I_A = 0,5A$ (D)

21) (A)

Moving

22) $x_m = 2,25sm$
$x = 1,125sm$
$l = ?$

$l = 3x_m + 1,2 =$
$= 6,6 + 1,2 = 7,8.$

$l = 7,8sm$

23) $R = 10\Omega$
$C = 13 \cdot 10^{-3} F$
$L_1 = 1308H$
$\omega = 0,27 rad/s$
$\cos\varphi = ?$

$\cos\varphi = \frac{R}{\sqrt{R^2 + (x_L - x_C)^2}} = \frac{10}{\sqrt{100+0}} = 1$

(D)

24) $D = 5 dptr$
$d = 0,16m$
$-d + f = ?$

$5 = \frac{1}{0,16} + \frac{1}{f}$

$f = 0,8m$
$f - d = 80 - 16 = 64sm$ (B)

25) (A)

26) $R = \pi \cdot 10^{-7} \Omega$
$N = 10^3 W$
$I = ?$

$I = \frac{N}{R} = \frac{10^3}{\pi \cdot 10^{-7}} = 3 \cdot 6 kA/\Omega$ (A)

27) (B) 28) (C) 29) (A)

30) $^{235}_{92}U - {}^{4}_{2}X - {}^{0}_{-2}y = {}^{231}_{92}M$ (A)

18-variant.

1) (A)

2) $v_0 = 4 m/s$
$F_q = 8v$
$l = 50m.$
$m = ?$

$\frac{mv_0^2}{2} = F_q \cdot l$ $\quad \frac{m \cdot 16}{2} = 16 \cdot 50$

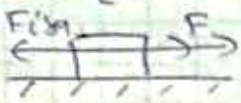
$m = 100 kg$ (C)

[18-variant

3) (A)

4) $M=0{,}05$
$m=50\cdot10^3$ kg
$l=25$ m
$t=50$ s
$F=?$

$l=\frac{at^2}{2} \Rightarrow a=\frac{2l}{t^2}=\frac{50}{50^2}=\frac{1}{50}$

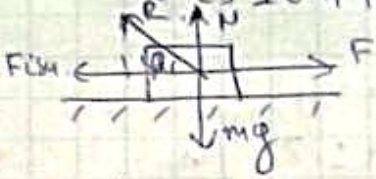


$F-F_{ism}=ma$

$F=Mmg+ma=0{,}5\cdot50\cdot10^3+50\cdot10^3\cdot\frac{1}{50}=$

$=25\cdot10^3+10^3=26$ kN (B)

5) $m=2$ kg
$F=5$ N
$M=0{,}5$
$ctg\varphi=?$

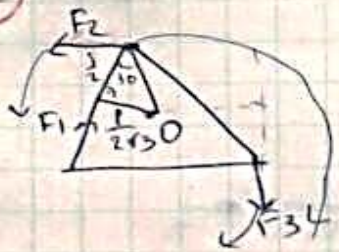


$ctg\varphi=\frac{F_{ism}}{N}=\frac{5}{20}=0{,}125$ (C)

6) (B)

7) (C)

8) $a=1$ m
$F_1=2\sqrt{3}$ N
$F_2=\sqrt{3}$ N
$F_3=2$ N
$M=?$



$M_1+M_3-M_2=$
$=2\sqrt{3}\cdot\frac{1}{2\sqrt{3}}+2\cdot\frac{1}{2}-\sqrt{3}\cdot\frac{1}{\sqrt{3}}=$
$=1$ (D)

9) $\left(-\frac{GmM}{R}\right)+A=\left(-\frac{GmM}{1{,}1R}\right)$

$A=\frac{GmM}{R}-\frac{GmM}{1{,}1R}=\frac{0{,}1GmM}{1{,}1R}=\frac{gmR}{11}$ (C)

10) $C_V\,\Delta T=\frac{i}{2}\cdot\frac{M}{M}R\Delta T$ (B)

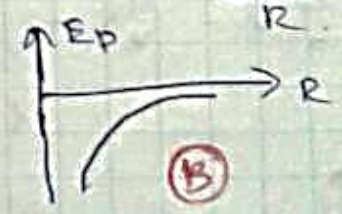
$C_V=3R$

11) (E)

12) $A_{izo}=\Delta R\Delta T$

$A_{adi}=-\frac{3}{2}\Delta R\Delta T=\frac{3}{2}A=-1{,}5A$ (D)

13) $E_p=-\frac{2kq^2}{R}$



(B)

14) $4m\cdot3v-4mv=8m\cdot v_x$

$v_x=\frac{8mv}{8m}=v$ (D)

15) $q_1 = q_2 = 8 \cdot 10^{-9}$ C.
$R_1 = 3 \cdot 10^{-2}$ m.
$R_2 = 5 \cdot 10^{-2}$ m.
$\frac{E_{P2}}{E_{P1}} = ?$

$E_{P1} = \frac{K \cdot 64 \cdot 10^{-18}}{R}$

$\frac{K \cdot q_1'}{3} = \frac{K \cdot q_2'}{5}$

$q_2' = \frac{5q_1'}{3}$

$\frac{5q_1'}{3} + q_1' = 16 \cdot 10^{-9}$

$q_1' = \frac{48 \cdot 10^{-9}}{8} = 6 \cdot 10^{-9}$

$q_2' = \frac{5}{3} \cdot 6 \cdot 10^{-9} = 10 \cdot 10^{-9}$ C

$E_{P2} = \frac{K \cdot 60 \cdot 10^{-18}}{R}$

$\frac{E_{P2}}{E_{P1}} = \frac{60}{64} = \frac{15}{16}$ (B)

16) $a = 6,4 \cdot 10^{11}$ m/s²
$E = ?$

$ma = Eq \Rightarrow E = \frac{ma}{q} = \frac{1,67 \cdot 10^{-27} \cdot 6,4 \cdot 10^{11}}{1,6 \cdot 10^{-19}} = 6,64$ kV/m (A)

17) $ctg 30° = \frac{4}{J}$. (B)

$R = \sqrt{3}$

18) $R = 10R$.
$J = 5t$
$t = 2$s.
$W = ?$

$Q = J^2 R t$
$\Delta Q = J^2 R \Delta t$.
$Q = \int dQ = \int J^2 R dt = \int 250 t^2 dt = \frac{250 t^3}{3} =$
$= \frac{250 \cdot 8}{3} = 666$ J (C)

19) $1A \cdot 3,6 \cdot 10^3 s = 3,6 \cdot 10^3$ C (B)

20) (C)

21) $x_m = 2,25$m.
$l = 1,28$m
$x = ?$

$x = 2x_m + l = 4,4 + 1,2 = 5,6$ J: 5,65m.

22) $R = 20R$
$X_L = 20R$
$\Delta\varphi = ?$

$\cos\varphi = \frac{R}{Z} = \frac{20}{20\sqrt{2}} = \frac{1}{\sqrt{2}} \Rightarrow \varphi = \frac{\pi}{4}$ (A)

23) (D)

18-variant

Mexina

18-variant

24) $\Phi = 5$ dptr. $d = 0{,}15$ m. $f - d = ?$

$\frac{1}{0{,}15} - \frac{1}{f} = -5$.

$(f)^{-1}$ $\frac{100}{15} + 5 = \frac{175}{15}$ $f = \frac{15}{175}$ m =

$= \frac{1500}{175} = 8{,}6$ sm.

15 − 8,6 = 6,4. (A)

25) (A)

26) $P \cdot e = 100$ D. $P = \frac{100}{3} \cdot 10^{-8}$. $t = 10^{-12}$ s. $R = 10^{6}$ Ω. $\vartheta = ?$

$N = \frac{N}{t} = \frac{W}{tR} = \frac{100}{10^{-12} \cdot 10^{-6}} = 10^{20}$.

(A)

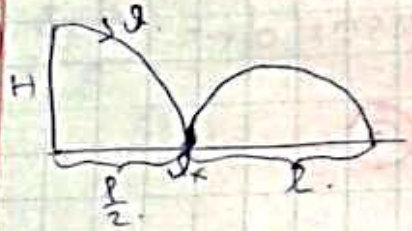
Молча выхожу

27) (A) 28) (D) 29) (A) 30) A

19-variant

1) (A)

2)



$\vartheta_x = \sqrt{\vartheta^2 + 2gH}$

$\frac{l}{2} = \vartheta \cdot \sqrt{\frac{2H}{g}}$ ⇒ $l = 2\vartheta\sqrt{\frac{2H}{g}}$ (C)

3) $\vartheta_0 = 10$ m/s. $F_q = 2\vartheta$. $m = 4$ kg. $l = ?$

$\frac{m\vartheta_0^2}{2} - \frac{m\vartheta^2}{2} = F_q \cdot l$

$2 \cdot (10^2 - 5^2) = 15 \cdot l$.

$l = \frac{2 \cdot 75}{15} = 10$ m. (B)

4)

$p = 700$

$\rho_x = 1000$

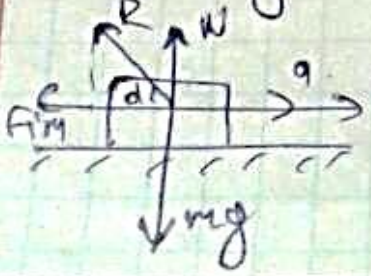
$F_{A1} + F_{A2} = mg$.

$700(V - V_1) + 1000 V_1 = 800V$.

$300 V_1 = 100V$

$V_1 = \frac{V}{3}$ (B)

5)



$\operatorname{tg}\alpha = \frac{F_{тр}}{N} = \frac{\mu mg}{mg} = 0{,}15$

(C)

6) (A)

7) $x' = \frac{x_1 m_1 + x_2 m_2 + \dots}{m_1 + m_2 + \dots} = \frac{(-50)\cdot 8}{8+2} = -40$. (A)

19-variant

8) $a = 4\ m/c^2$
$R = 2\cdot 10^{-3}\ m$
$\sigma = 73\cdot 10^{-3}\ N/m$
$g = 10$
$h = ?$

$h = \frac{2\sigma}{\rho(g+a)r} = 5{,}2\cdot 10^{-3}\ m$ (A)

9) $\frac{mv^2}{2} = \frac{GmM}{R} \Rightarrow gRM$ (A)

10) $M = 28\cdot 10^{-3}\ kg/mol$
$v = 200\ m/c$
$T = ?$

$v = \sqrt{\frac{3RT}{M}} \Rightarrow T = \frac{v^2 M}{3R} = 45$ (A)

11) $A = A_1 + A_2 = +1{,}5\,\vartheta R\Delta T$.
$\vartheta R\Delta T = 0{,}4\ A$.
$A_1 = 1{,}5\,\vartheta R\Delta T = 0{,}6A$ (C)
siqilsa $A_T = -A_1 = -0{,}6A$.

12) (C)

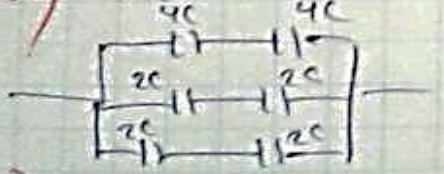
13) $\sqrt{(3m\vartheta)^2 + (4m\vartheta)^2} = 5m\vartheta$ (A)

14) $4m\vartheta - 3m\vartheta = 5m\vartheta_x$
$\vartheta_x = \frac{\vartheta}{5}$. (D)

15) $R = 9\cdot 10^{-2}\ m$.
$q_1 = 2\cdot 10^{-6}\ C$.
$q_2 = 3\cdot 10^{-6}\ C$
$A = ?$

$A = \frac{q_2^2 - q_1^2}{2C} = \frac{5\cdot 10^{-12}}{8\pi\cdot 8{,}85\cdot 10^{-12}\cdot 9\cdot 10^{-2}}$
$= \frac{500}{72\pi\cdot 8{,}85} = 0{,}25$ (A)

16) Sxemani soddalashtiramiz:



$C_{um} = 2C + C + C = 4C$ (B)

Yoxlandi Buxoro

17) $j = 2\ A/m^2$
$E = 6\cdot 10^{-6}\ V/m$
$\rho = ?$

$\rho = \frac{E}{j} = 3\cdot 10^{-6}$ (B)

19-variant

18) $R=12\Omega$, $\nu=6t$, $t=5s$, $Q=?$

$Q=\nu^2 Rt$. $\Delta Q=\nu^2 R\Delta t$.

$Q=\int dQ=\int \nu^2 R\,dt=\int 6t^2\cdot 12\,dt=\frac{36\cdot 12\cdot t^3}{3}=$

$=144\cdot 125=18000$ (B)

19) (B) 20) C 21) B.

22) $R=20\Omega$, $C=13\cdot 10^{-3}F$, $L=130mH$, $I_m=13A$, $U=?$

$X_L=X_C$.

$U=I_m\cdot Z=I_m\cdot R=260V$

(D)

23) $R=40\Omega$, $X_L=30\Omega$, $\cos\varphi=?$

$\cos\varphi=\frac{R}{Z}=\frac{40}{50}=0,8$

(A)

24) $l=\frac{c}{n}\cdot t=\frac{3\cdot 10^8}{1,5}\cdot 0,1=2\cdot 10^7 m$ (C)

25) (D)

26) $W=8J$, $t=2\cdot 10^{-11}s$, $R=10^{-6}sr$, $S=5\cdot 10^{-5}m^2$, $\frac{N}{S}=?$

$\frac{N}{S}=\frac{W}{tS}=\frac{8}{2\cdot 10^{-11}\cdot 5\cdot 10^{-5}}=$

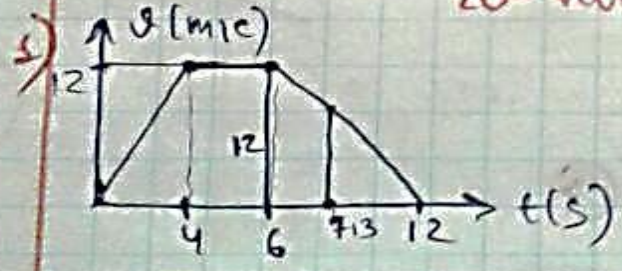
$=8\cdot 10^{+15}\ W/m^2$ (C)

27) (B) 28) (A)

29) $\frac{80\cdot t}{\Delta N}=\frac{80\cdot 24}{960}=2$ (A)

30) $E_T=(90+8)\cdot 20=1960\ eV$ (C)

20-variant.

1) 

$\frac{6}{12}=\frac{4,7}{\vartheta}$.

$\vartheta=9,4 m/c$ (A)

20-variant

2) $h = \frac{\vartheta^2}{2g} = \frac{4}{2 \cdot 1{,}67} = \frac{2}{1{,}67} = 1{,}2\,m$ (B)

3) $m_1 = m_2$
$\vartheta_{01} = \vartheta_{02}$
$K_1 = 2K_2$
$\frac{S_2}{S_1} = ?$

$$\begin{cases} \frac{m_1 \vartheta_{01}^2}{2} = K_1 \frac{\vartheta_{01}}{2} \cdot S_1 \\ \frac{m_2 \vartheta_{02}^2}{2} = K_2 \frac{\vartheta_{02}}{2} \cdot S_2 \end{cases}$$

$\frac{1}{2} \cdot \frac{S_2}{S_1} = 1 \quad \frac{S_2}{S_1} = 2$ (A)

4) (A)

5) (B)

6) $P_1 = P_2$
$m\vartheta_1 = 2m\vartheta_2$
$\vartheta_2 = \frac{\vartheta_1}{2}$

$\frac{E_1}{E_2} = \frac{m_1 \vartheta_1^2}{m_2 \vartheta_2^2} = \frac{1}{2} \cdot 4 = 2$ (B)

7) $a = 3m/c^2$
$h = 0{,}1m$
$P = ?$

$P = \rho \sqrt{a^2 + g^2} \cdot h = 10^3 \cdot \sqrt{109} \cdot 0{,}1 =$
$= \sqrt{1{,}09}\ KPa$ (2)

8) $q = 2m/c^2$
$R = 2 \cdot 10^{-3}\,m$
$\sigma = 73 \cdot 10^{-3}\,N/m$
$h = ?$

$h = \frac{2\sigma}{\rho(g-a)2} = \frac{2 \cdot 73 \cdot 10^{-3}}{10^3 \cdot 8 \cdot 2 \cdot 10^{-3}} =$
$= 9{,}125\,mm$ (B)

9) $E = \frac{GMm}{1{,}1R} = \frac{gmR}{1{,}1}$ (2)

10) $\rho = \frac{PM}{RT} = \frac{10^5 \cdot 38 \cdot 10^{-3}}{8{,}31 \cdot 273} = 1670\,g/m^3$ (B)

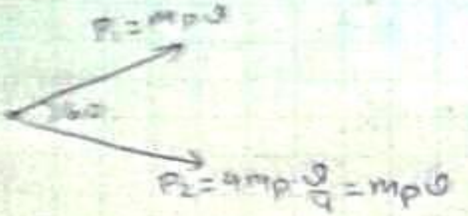
11) $T = 30\,K$
$N = 6 \cdot 10^{22}$ to
$V_1 = 0{,}1\,m^3$
$V_2 = 0{,}272\,m^3$
$A = ?$

$A = \vartheta RT \ln \frac{V_2}{V_1} = \frac{N}{N_A} RT \ln 2{,}72 =$
$= \frac{6 \cdot 10^{22}}{6 \cdot 10^{23}} \cdot 8{,}3 \cdot 30 = 24{,}84$ (A)

12) (E)

20-variant

13)



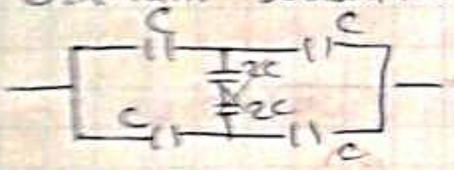
$P_n = \sqrt{P^2 + P^2 + 2P^2\cos 60°}$
$= mp\vartheta\cdot\sqrt{3}$ (B)

14) $4m\vartheta + m\vartheta = (4m+m)\vartheta_x$.
$\vartheta_x = \vartheta$ (D)

15) $R = 9\cdot10^{-2}m$.
$q_1 = 2\cdot10^{-6}c$.
$q_2 = 4\cdot10^{-6}c$
$A = ?$

$A = \frac{q_2^2 - q_1^2}{2\cdot4\pi\varepsilon_0 R} = \frac{12\cdot10^{-12}}{8\pi\cdot8{,}85\cdot10^{-12}\cdot9\cdot10^{-2}}$
$= 0{,}6J$. (A)

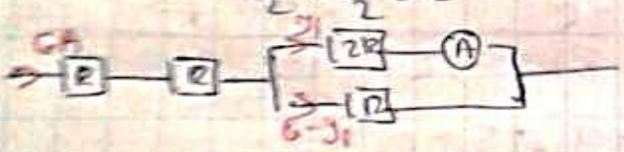
16) Sxemani soddalashtiramiz:



$\frac{C}{C} = \frac{C}{C}$ => o'rtadagi simda zaryad bo'lmaydi.

$C_{um} = \frac{C}{2} + \frac{C}{2} = C$. (C)

17)



$J = 6A$
$J_A = ?$
$R_{um} = 2R + \frac{2R}{3} = \frac{8R}{3}$.

$J_1\cdot2R = (6-J_1)\cdot R$.
$3J_1 = 6$.
$J_1 = 2A$. (C)

18) $R = \frac{\rho l}{S} = \frac{1{,}68\cdot10^{-8}\cdot0{,}1}{8\cdot10^{-4}} = 2{,}1\cdot10^{-6}\Omega$ (a)

19) $\frac{m\vartheta^2}{2} = eEl$ (B) 20) (A)

Yoxina Buxoro

21) (B) 22) (C)

23) $X_L = 70\Omega$.
$X_C = 50\Omega$.
$\cos\varphi = ?$

$\cos\varphi = \frac{R}{Z} = 0$.

(A)

24) $l_0 = 0{,}2m$
$n = 1{,}5$
$t = 5 \cdot 10^{-4} s$
$N = ?$

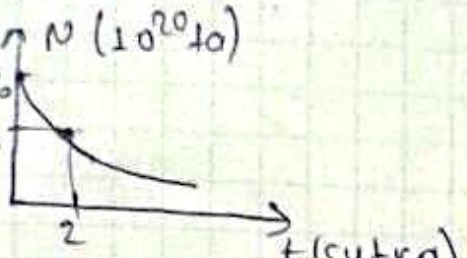
1 marta borib kelsa $2l_0 = 0{,}4m$ yuradi

$$l = \frac{c}{n} \cdot t = \frac{3 \cdot 10^8}{1{,}5} \cdot 5 \cdot 10^{-4} = 10 \cdot 10^4 = 10^5 m$$

$$N = \frac{10^5}{0{,}4} = 2{,}5 \cdot 10^5 \quad (B)$$

25) (D)

26)



$$N = N_0 \cdot 2^{-\frac{t}{T}}$$

$T = 2$ · $t = 8$ soat.

$$N = 16 \cdot 10^{20} \cdot 2^{-\frac{8}{2}} = 10^{20} \quad (A)$$

27) (D)

28) $W = 15 J$.
$m = 1{,}6 \cdot 10^{-6} kg$
$\vartheta = ?$

$$P \cdot c = W$$
$$P = \frac{15}{3 \cdot 10^8} = 5 \cdot 10^{-8}$$
$$m\vartheta = 2P$$
$$\vartheta = \frac{10 \cdot 10^{-8}}{1{,}6 \cdot 10^{-6}} = 0{,}06 m/c \quad (C)$$

29) (C)

30) $E = 8 \cdot 10^6 \cdot 204 = 1{,}63$ gEV (C)

21-variant.

30) $E = 8 \cdot 10 \ldots$

21-variant.

1) $\vartheta_0 + \frac{g}{2}(2n-1) = 35$

$10 + 5(2n-1) = 35$

$n = 3$

$h = \vartheta_0 t + \frac{gt^2}{2} = 10 \cdot 3 + 5 \cdot 9 = 75m$

(D)

2) A(1,2,3) dan B(0,0,0) ga 6s da
B(0;0;0) dan C(13,5,7) ga 7s da

$\vartheta_{o'rt.\ ko'chish} = ?$

$\vartheta_{o'rt.k} = \frac{\sqrt{12^2+3^2+4^2}}{6+7} = 1\ m/c$

(A)

21-variant

3) $\vartheta_0 = 10\ m/c$
$l = 8\ m$
$F_q = 2q$
$m = 4\ kg$
$\vartheta = ?$

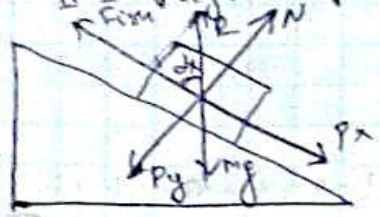
$\frac{m\vartheta_0^2}{2} - \frac{m\vartheta^2}{2} = F_q \cdot l$ (B)

$2 \cdot (100 - \vartheta^2) = (10 + \vartheta) \cdot 8$

$2(10 - \vartheta) = 8 \quad \vartheta = 6\ m/c$

4) $\vartheta_{II} = \sqrt{2gR'} = \sqrt{2 \cdot 1{,}6 \cdot 1350 \cdot 10^{-3}} = 2{,}1\ km/c$ (A)

5)



$ctg\,\alpha = \frac{F_{ism}}{N} = \frac{mg\sin\alpha}{mg} = \sin 30^\circ = \frac{1}{2}$

(C)

6) (C)

7) $x' = \frac{x_1 m_1 + x_2 m_2 + \dots}{m_1 + m_2 + \dots} = \frac{(-50) \cdot 8 + 50 \cdot 10}{20} = 5$ (B)

8) $a = 6\ m/c^2$
$d = 2 \cdot 10^{-3}\ m$
$\sigma = 73 \cdot 10^{-3}\ N/m$
$h = ?$

$h = \frac{2\sigma}{\rho(g + a)d} =$ (B)

$= 9{,}125\ mm$

9) $l = 0{,}2\ m$
$F = 40\ N$
$\alpha = 5^\circ$
$A = ?$

$A = F \cdot l \sin\alpha = F \cdot l \cdot \sin 5^\circ =$

$= 6{,}67 \cdot 10^{-3}\ J$

(A)

10) $\rho = \frac{pM}{RT} = \frac{10^5 \cdot 4 \cdot 10^{-3}}{8{,}31 \cdot 273} = 179\ g/m^3$ (D)

11) $T = 300\ K$
$N = 8 \cdot 10^{21}$ ta
$V_1 = 0{,}1\ m^3$
V_2
$Q = 66{,}24\ J$
$V_2 = ?$

$Q = \frac{N}{N_A} RT \ln \frac{V_2}{V_1}$

$66{,}24 = \frac{8 \cdot 10^{21}}{6 \cdot 10^{23}} \cdot 8{,}31 \cdot 300 \ln \frac{V_2}{V_1}$

$V_2 = 738\ l$ (A)

12) $R_2 = 2R_1$
$q_1 = q_2 = 5q$
$q_1' = ? \quad q_2' = ?$

Potensiallari tenglashgancha zaryad almashadi. 21-variant.

$\frac{k\cdot q_1'}{R_1} = \frac{k\cdot q_2'}{2R_1} \Rightarrow q_2' = 2q_1'$

$3q_1' = 10q$

$q_1' = \frac{10q}{3} \Rightarrow$ elektron bo'linmaydi.

$\boxed{\varphi_1 > \varphi_2}$ 2-sharchaga (2q) ya'ni 2ta elektron beramiz.

$\frac{k\cdot(5q-x)}{R_1} = \frac{k(7q+x)}{2R_1}$ $\quad 10q-2x = 7q+x$.

$3q = 3x \Rightarrow \boxed{x = q}$ (D)

1) $5q-q = 4q$.
2) $7q+q = 8q$. 2ta elektronni olamiz: 4q va 6q

13) $4m\vartheta = 4m\cdot 0{,}85\vartheta + m\vartheta_x$. (B)

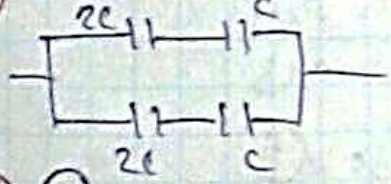
$\vartheta_x = 0{,}2\vartheta$

14) $4m\vartheta - 0{,}5m\vartheta = 5m\cdot\vartheta_x \Rightarrow \vartheta_x = 0{,}7\vartheta$. (A)

15) $E = 10^5$ V/m.
$l = 1$ m.
$q_1 = 10^{-6}$ C.
$m = 10^{-2}$ kg.

$E_{max} = ?$

16) Sxemani soddalashtiramiz:



$C_{um_1} = \frac{2C}{3}$. $\quad C_{um} = \frac{2C}{3}$. $\quad C_{um_3} = \frac{4C}{2}$. (C)

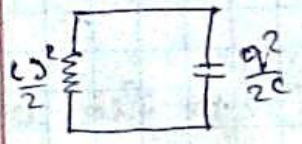
17) (B)

18) $\frac{R_1}{R_2} = \frac{\beta\cdot c}{ab}\cdot\frac{ab}{\beta b} = \frac{c^2}{b^2} \Rightarrow R_2 = \frac{b^2}{c^2}\cdot R_1$ (A).

19) yarim o'tkazgich. (B)

20) $B = 1\,T$ / $w = ?$ — $B = \mu\mu_0 H \Rightarrow H = 4 \cdot 10^5$ (A) — 21-variant

21) (A) 22) (D)

23) 

$(0;2\pi)$
$\frac{\pi}{4} \cdot 5 = 1{,}25\pi$ (A)

24) (B) 25) (D)

26) $S = 0{,}1\,m^2$
$\alpha = 60°$
$E = 400\,J/m^2c$
$t = 20\,s$ / $\Phi = ?$

$E = \frac{\Phi}{S\cos\alpha}$
$\Phi = 400 \cdot 0{,}1 \cdot \frac{1}{2} = 20$ (C)

27) $W = 35\,J$
$m = 1{,}6 \cdot 10^{-6}\,kg$ / $\vartheta = ?$

$2 \cdot \frac{35}{3 \cdot 10^8} = m\vartheta$
$\vartheta = 0{,}15\,mlc$ (D)

28) (A) 29) (B)

30)

22-Variant

1) $h = 5t^2 = 180$
$t = 6\,s$

$\frac{\frac{g}{2}(2 \cdot 6 - 1)}{\frac{g}{2}(2 \cdot 3 - 1)} = \frac{11}{5}$ (A)

2) $\vartheta_{52} = \frac{\sqrt{12^2 + 3^2 + 4^2}}{10 + 3} =$

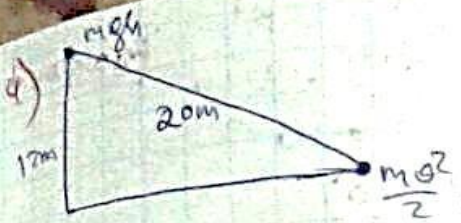
$= 1\,mlc$ (A)

3) $m = 100\,kg$
$F_q = 9\vartheta$
$l = 20\,m$
$\vartheta = 2{,}2\,mlc$ / $\vartheta_0 = ?$

$\frac{m\vartheta_0^2}{2} - \frac{m\vartheta^2}{2} = F_{\bar{\vartheta}} \cdot l$
$50(\vartheta_0^2 - 2{,}2^2) = 20 \cdot \frac{9(\vartheta_0 + \vartheta)}{2}$
$\vartheta_0 = 4\,mlc$

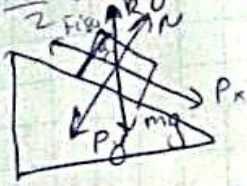
(A)

M = 0,5
θ = ?

4) 

$\frac{m\theta^2}{2} = mgh + F_{isq} \cdot \ell$ (A)

$\frac{\theta^2}{2} = 120 + 100 \Rightarrow \theta = 20 \text{ m/s}$

5) 

$ctg\,\varphi = \frac{F_{isq}}{N} = \frac{mg\sin\alpha}{mg\cos\alpha} = tg\alpha = tg\,60 = \sqrt{3}$ (D)

6) Impuls → özgürmüydü, kinetik enerji → artadı (A)

7) $y' = \frac{y_1 m_1 + y_2 m_2 + \dots}{m_1 + m_2 + \dots} = \frac{0,5 \cdot 8 + 0,5 \cdot 10 + (-0,5) \cdot 2}{8 + 10 + 2 + 2} = \frac{8}{22} = \frac{4}{11}$ (B)

8) $a = 4 \text{ m/s}^2$
$d = 2 \cdot 10^{-3} \text{ m}$
$\sigma = 73 \cdot 10^{-3} \text{ N/m}$
$h = ?$

$h = \frac{2\sigma}{\rho g d} = 12,16 \text{ mm}$ (C)

9) $A = F \cdot \ell \cdot \frac{d\pi}{180} = 40 \cdot 0,3 \cdot \frac{3 \cdot 3}{180} =$

$= 12 \cdot \frac{1}{20} = 0,6$

10) (A) 11) (A) 12) (C)

13) $4m \cdot 2\theta = 4m \cdot 0,5\theta + m \cdot \theta_x$.

$\theta_x = \frac{4m \cdot 1,5\theta}{m} = 6\theta$ (D)

14) $4m \cdot 2\theta - m\theta = (4m + m)\theta_x$.

$\theta_x = \frac{7m\theta}{5m} = \frac{7\theta}{5}$. (D)

15) $E = 1,73 \cdot 10^5 \text{ V/m}$
$\ell = 0,6 \text{ m}$
$q = 10^{-6} \text{ C}$
$m = 10^{-2} \text{ kg}$

$E_{max} = ?$

16) $q = 6{,}4 \cdot 10^{11} mlc^2$ /

$E = ?$

$ma = Eq$

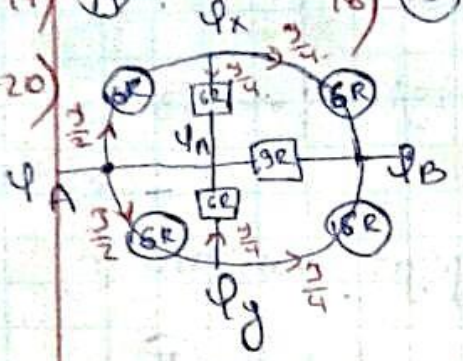
$E = \frac{mq}{q} = \frac{4 \cdot 1{,}67 \cdot 10^{-27} \cdot 6{,}4 \cdot 10^{11}}{2 \cdot 1{,}6 \cdot 10^{-19}} = 13{,}28 \cdot 10^{3}$ (C)

22-Variant

17) (A) 18) (B)

19) (A)

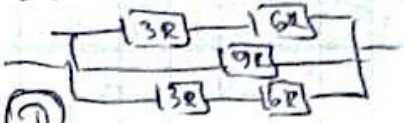
20)



$$+\begin{cases} \varphi_A - \varphi_x = \frac{1}{2} \cdot 6R \\ \varphi_x - \varphi_B = \frac{1}{4} \cdot 6R \end{cases}$$

$\varphi_A - \varphi_B = 6R \cdot \frac{3}{4} = 1 \cdot R_{um}$

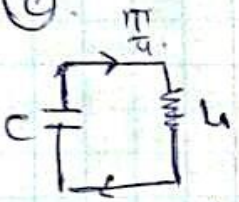
Soddalashtirsak:



$R_{um} = \frac{9R}{3} = 3R$ (C)

21) (C) 22) (D)

23)



$(0; 4{,}7\pi)$

$\frac{\pi}{4} \cdot 8 + \frac{\pi}{4} = 2{,}25T$ (B)

24) $d = 1 \cdot \sin 45 = \frac{\sqrt{2}}{2}$ (A)

25) (D) 26) (B)

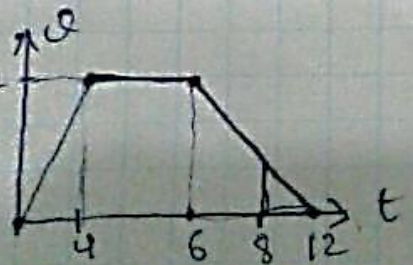
27) $E = h\vartheta \Rightarrow \vartheta = \frac{E}{h} = \frac{2{,}132 \cdot 10^{-13}}{6{,}63 \cdot 10^{-34}} = 3{,}5 \cdot 10^{20}$ (C)

28) (D) 29) (A)

30)

23-Variant

1)



$\frac{4}{16} = \frac{v}{12}$ 2.

$v = 8 m/c$

(D)

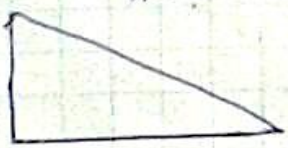
23 varian

2) $\beta = 12\pi - 3\pi t = 0$.
$t = 4s$.
$\omega = \int \beta = 12\pi t - \frac{3\pi t^2}{2} = 48\pi - \frac{3\pi}{2} \cdot 16 = 24\pi$

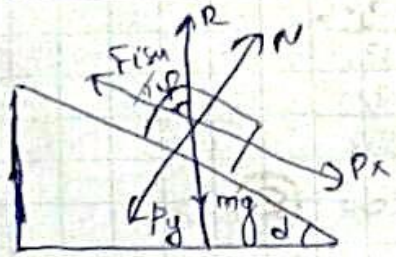
3) $m = 100kg$
$F_g = 200$
$v_0 = 4 m/s$
$v = 1 m/s$
$h = ?$

$\frac{mv_0^2}{2} - \frac{mv^2}{2} = F_g \cdot h$.
$50(4^2 - 1^2) = 50h$. (C)
$h = 15m$.

4)



5)



$ctg\varphi = \frac{F_{ism}}{N} = \frac{mg\sin\alpha}{mg\cos\alpha} = tg\alpha$. (A)

6) (C)

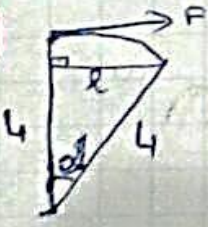
7) $R = 100m$.
$v = 30 m/s$
$h = 0,1m$.
$p = ?$

$p = \rho\sqrt{a^2 + g^2} \cdot h = 10^3 \cdot 0,1 \cdot \sqrt{\left(\frac{v^2}{R}\right)^2 + g^2} =$
$= 10^3 \cdot 0,1\sqrt{81 + 100} = \sqrt{1,81}$ kPa (2)

8) $v = 4 m/s$
$d = 2 \cdot 10^{-3} m$.
$\sigma = 73 \cdot 10^{-3} N/m$
$h = ?$

$h = \frac{2\sigma}{\rho g d} = \frac{2 \cdot 73 \cdot 10^{-3}}{10^4 \cdot 2 \cdot 10^{-3}} = 7,3 \cdot 10^{-3} m$
(A)

9)



$l = 4 \cdot \sin\alpha^\circ$.
$A = F \cdot l = F \cdot 4 \cdot \sin\alpha^\circ = F \cdot 4 \cdot \frac{\alpha\pi}{180}$ (1)

10) (A) 11) (C)

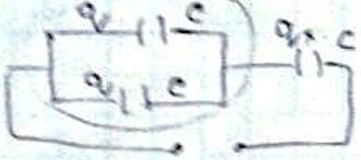
12) $\frac{\varphi_g}{\varphi_{1g}} = \frac{kq \cdot R_{1g}}{R_g \cdot kq} = \frac{R_{1g}}{R_g} = \frac{\sqrt{5^2 + 1^2}}{\sqrt{3^2 + 1^2}} = \sqrt{\frac{26}{10}} = \sqrt{\frac{13}{5}}$ (B)

13) $m\vartheta = 4m \cdot 0{,}2\vartheta + m\vartheta_x \Rightarrow \vartheta_x = \frac{0{,}2m\vartheta}{m} = 0{,}2\vartheta$ (B)

23-variant

14) $4mv = (4m+m)\cdot \vartheta_x$.
$\vartheta_x = \frac{4\vartheta}{5} = 0{,}8\vartheta$ (D)

15) $C_1 = C_2 = C_3 = 2\cdot 10^{-6}$ F



$q_x = 2q = 2\cdot 3nC = 6nC$ (A)

16) $\varphi_1 = \frac{K\cdot 6q}{7{,}9}$.
$\varphi_2 + \Delta\varphi = \varphi_1$.
$\frac{K\cdot 6q}{15{,}8} + \Delta\varphi = \frac{K\cdot 6q}{7{,}9}$.
$\Delta\varphi = \frac{K\cdot 6q}{15{,}8}$

$\varphi_2 - \Delta\varphi = \frac{K\cdot q\cdot 6}{R_x}$.
$\frac{6Kq}{15{,}8} - \frac{6Kq}{15{,}8} = \frac{6Kq}{R_x}$
$R_x = \infty$ (E)

17) $E = 2\cdot 10^3$ V/m.
$\frac{N}{V} = 0{,}2$
$\rho = ?$

$\frac{y^2 R}{V} = 0{,}2$ $\frac{y^2\cdot \rho\delta}{S\cdot S\cdot \delta} = 0{,}2$
$\left(\frac{E}{\rho}\right)^2 \cdot \rho = 0{,}2$ (C)
$\rho = \frac{E^2}{0{,}2} = \frac{4\cdot 10^{-6}}{0{,}2} = 2\cdot 10^{-5}$.

18) (C) 19) (B) 20) (B) 21) (A)

22) (D) 23) (C) 24) (A) 25) (A) 26) (A)

27) $E = 4{,}64\cdot 10^{-13}$ J.
$h = 6{,}63\cdot 10^{-34}$ J·s
$\vartheta = ?$

$E = h\vartheta$.
$\vartheta = \frac{E}{h} = \frac{4{,}64\cdot 10^{-13}}{6{,}63\cdot 10^{-34}} = 2\cdot 10^{20}$. (A)

28) (B)

29) $\frac{N_n}{N_{elek}} = \frac{146}{92} = \frac{73}{46}$ (A)

30) $n\cdot \frac{h}{2\pi}$ (C)

24- variant

1) $\frac{1}{\vartheta} = \frac{4}{12} \Rightarrow \vartheta = 3$. (C)

2) $l_1 = 6$ km.
$\vartheta_1 = 24$ km/h.
$\vartheta_2 = 32$ km/h.
$\vartheta_{ö2} = 28$ km/h.
$l_K = ?$

$\vartheta_{ö2} = \frac{l_ö}{t_ö} = \frac{l_2 + 6}{\frac{6}{24} + \frac{l_2}{32}} = 28$

$\frac{l_2}{32} + \frac{1}{4} = \frac{l_2}{28} + \frac{3}{14}$

$\frac{1}{28} = \frac{l_2}{224}$ $\quad l_2 = 8$ km.

$l_K = \sqrt{6^2 + 8^2} = 10$ km. (A)

3) $F_q = 18\vartheta$
$m = 100$ kg
$\vartheta_0 = 4$ m/s.
$l = 20$ m
$\vartheta = ?$

$18(4+\vartheta) \cdot 20 = \frac{100}{2} \cdot (4^2 - \vartheta^2)$

$18 \cdot 20 = 100 \cdot (4 - \vartheta)$

$\vartheta = 0{,}4$ m/s. (B)

4) $m = 8$ kg
$F = 10$ N.
$F_x = ?$

$Mmg = 10$.

$M \cdot \frac{m}{5} \cdot g = \frac{10}{5} = 2$ N. (B)

5) $\vartheta = 10^3$ m/s.
$R = 6300 \cdot 10^3$ m
$h = ?$

$\frac{m\vartheta^2}{2} = mgh$. (D)

$h = \frac{\vartheta^2}{2g} = \frac{10^6}{20} = 5 \cdot 10^4 = 50$ km

6) (D)

7) $m = 2$ kg
$a = 1$ m.
$m_1 = 8$ kg
$m_2 = 6$ kg.
$m_3 = 4$ kg
$m_4 = 2$ kg
$(x; y) = ?$

$y' = \frac{y_1 m_1 + y_2 m_2 + \dots}{m_1 + m_2 + \dots} = \frac{50 \cdot 14 - 50 \cdot 6}{22} =$

$= \frac{50 \cdot 8}{22} = \frac{200}{11}$ cm $= \frac{2}{11}$ m.

$x' = \frac{10 \cdot 50 - 50 \cdot 10}{22} = 0$. $\quad \left(0; \frac{2}{11}\right)$ (D)

8) $h = 500$ m.
$S = 2 \cdot 10^{-4}$ m^2.
$t = 78$ s
$m = ?$

$\vartheta = \sqrt{2gh'} = \sqrt{20 \cdot 500} = 100$ m/s.

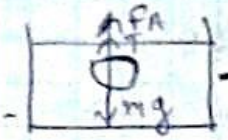
$m = \rho \cdot S \cdot \vartheta t = 10^3 \cdot 2 \cdot 10^{-4} \cdot 10^2 \cdot 78 =$

$= 1560$ (D)

29-variant

9) $S = 50 \cdot 10^{-4}\ m^2$
$\Delta h = 4 \cdot 10^{-2}\ m$

$T = ?$



$$\begin{cases} V_{snar} + V_{sap} = S \cdot h \\ V_{sap} + V_{bot} = S'(h - 4 \cdot 10^{-2}) \end{cases}$$

$V_{sn} - V_{bot} = 4 \cdot 10^{-2} S' \Rightarrow V_{cu} = 4 \cdot 50 \cdot 10^{-6} = 2 \cdot 10^{-4}\ m^3$

$T = mg - F_n = \rho_c V_{cu} g = 10^4 \cdot 2 \cdot 10^{-4} = 2$ (C)

10) (B)

11) $\frac{3}{2} \nu R T + \nu R T = 1000 \Rightarrow \nu R T = 600\ J$

$A_{12} = \frac{3}{2} \nu R T = \frac{3}{2} \cdot 400 = 600\ J$

$A_T = -600\ J$ (A)

12) $m\theta = m \cdot 0{,}2\theta + 4m \cdot \vartheta_x$

$\vartheta_x = \frac{0{,}8 m\theta}{4m} = 0{,}2\theta$ (D)

13) $m\theta = 4m\vartheta_1 + m\vartheta_1 \Rightarrow \vartheta_1 = \frac{\theta}{5}$ (D)

14) (A)

15) $\frac{\varphi_{24}}{\varphi_7} = \frac{kq}{R_{24}} \cdot \frac{R_7}{kq} = \frac{\sqrt{2^2 + 4^2}}{\sqrt{3^2 + 2^2}} = \sqrt{\frac{20}{13}}$ (B)

16) (A)

17) $j = 2 \cdot 10^3\ A/m^2$
$\frac{N}{V} = 0{,}2\ \frac{W}{m^3}$
$\rho = ?$

$\frac{j^2 R}{V} = \frac{j^2 \cdot \rho l}{S \cdot S l} = 0{,}2$

$j^2 \rho = 0{,}2$

$4 \cdot 10^6 \cdot \rho = 0{,}2$ (C)

$\rho = 0{,}05 \cdot 10^{-6}$

18) (D)

19) (C) 20) (C) 21) (B)

22) $k=450\ N/m$, $m=4{,}5\ kg$, $\vartheta=0$. (A)

23) (A)

24) (A)

24-variant

25) (B)

26) $\frac{R}{\Delta\Omega}=\frac{6\cdot10^{7}}{5\cdot10^{-11}}=1{,}2\cdot10^{4}$. (C)

27) $E_k=m_0c^2$ $\quad \frac{hc}{R}=m\vartheta^2$ $\quad \vartheta=\sqrt{\frac{hc}{Rm}}$ (B)

28) $n=1,2,3,4,\dots$ (A)

29) $^{254}_{92}U-{}^{8}_{4}X-{}^{0}_{-1}\beta={}^{226}_{89}M$ (A)

30) (A)

25-variant

1) $t=5s$ vaqt momentida jism tekis harakatlanyapti $a=0$ (A)

2) $h=8\cdot3=24\ m$, $t=10s$, $\vartheta_{o'z}=?$ $\quad \vartheta_{o'z}=\frac{24}{10}=2{,}4\ m/s$ (A)

3) $m=100\ kg$, $l=6\ m$, $\vartheta_0=4\ m/s$, $\vartheta=2{,}8\ m/s$, $F_q=k\vartheta$, $k=?$

$\frac{m\vartheta_0^2}{2}-\frac{m\vartheta^2}{2}=F_q\cdot l$

$50\cdot(4^2-2{,}8^2)=k\cdot3{,}4\cdot6$

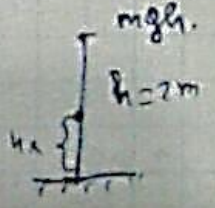
$k\approx20$. (C)

4) $\begin{cases} mg=80 \\ mg+ma=108 \end{cases}$ $\quad m=8$, $a=3{,}5\ m/s^2$. (B)

5) $F_n=ma=5\cdot5=25$. (C)

6) (A)

7) $m=0{,}2\ kg$, $h=2\ m$, $t=1{,}2s$, $\Delta Q=?$



$h_x=\frac{g\cdot0{,}6^2}{2}=5\cdot0{,}36=1{,}8$

$\Delta Q=mg\cdot2-mg\cdot1{,}8=2\cdot0{,}2=0{,}4$

(A)

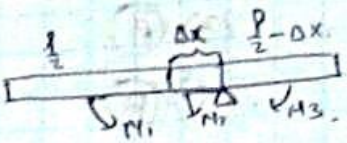
25-variant

8) $\ell = 5m$

$\frac{\rho_1}{\rho_2} = \frac{7}{9}$

$\Delta x = ?$

$\rho_2 = \frac{9\rho_1}{7}$



$M_1 + M_2 = M_3$.

$\rho_1 \cdot \frac{\ell}{2} \cdot \left(\frac{\ell}{4} + \Delta x\right) + \rho_2 \cdot \Delta x \cdot \frac{\Delta x}{2} = \frac{\rho_2 \cdot \left(\frac{\ell}{2} - \Delta x\right)^2}{2}$

$\rho_1 \ell \left(\frac{\ell}{4} + \Delta x\right) + \frac{9\rho_1}{7} \cdot \Delta x^2 = \frac{9\rho_1}{7} \cdot \left(\frac{\ell}{2} - \Delta x\right)^2$

$\frac{18}{7}\Delta x^2 + \frac{16}{7}\ell\Delta x + \frac{\ell^2}{4} - \frac{9\ell^2}{28} = 0$

$\frac{18}{7}\Delta x^2 + \frac{16}{7}\ell\Delta x + \frac{\ell^2}{14} = 0$.

$36\Delta x^2 + 32\ell\Delta x - \ell^2 = 0$.

$\Delta x = 0{,}16\ell$ (A)

9) $\begin{cases} V_{sh} + V_s = S \cdot h \\ V_b + V_s = \rho'(h - 0{,}02) \end{cases}$

$V_{sh} - V_b = \rho' \cdot 2 \cdot 10^{-2} = 150 \cdot 10^{-4} \cdot 2 \cdot 10^{-2} = 3 \cdot 10^{-4}$.

$V_{an} = 3 \cdot 10^{-4} m^3$ (D)

$T = mg - F_A = \rho V_{an} g = 10^4 \cdot 3 \cdot 10^{-4} = 3N$

10) (B) 11) (A) 12) (B)

13) Proton massasi pozitronga nisbatan juda katta bo'lgani uchun proton massiv devor vazifasini bajaradi.

$\vartheta_h = \vartheta + 2\vartheta = 3\vartheta$ (A).

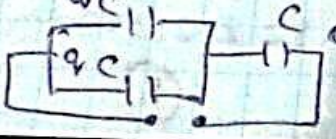
14) $4m\vartheta = 4m\vartheta_1 + m\vartheta_1$.

$\vartheta_1 = \frac{4m\vartheta}{5m} = 0{,}8\vartheta$ (C)

15) $\frac{U_4}{U_3} = \frac{q_4 \cdot \rho_3}{C_4 \cdot q_3} = \frac{2C}{4C} = \frac{1}{2}$ (B)

16) $q_4 = q_3$ (ketma-ket)

$C_1 = C_2 = C_3 = 2 \cdot 10^{-6} F$. $q_3 = 3nC$.



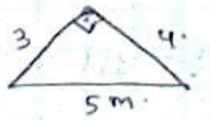
$q_x = 2q$.

$q = \frac{q_x}{2} = \frac{3nC}{2} = 1{,}5nC$ (A)

25-variant

17) (C) 18) (D) 19) (B)

20) $R = 5 m$.
$J = 3,14 A$.
$\ell_1 = 3 m$.
$\ell_2 = 4 m$
$H = ?$



$H = \frac{J}{2\pi R}$

$H = \sqrt{H_1^2 + H_2^2} = \sqrt{\left(\frac{3,14}{2\pi \cdot 3}\right)^2 + \left(\frac{3,14}{2\pi \cdot 4}\right)^2} = \frac{10}{48} = \frac{5}{24}$.

(A)

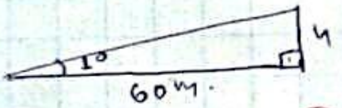
21) (C).

22) $T_1 = 2\pi\sqrt{\frac{m}{k}} = 2\pi\sqrt{\frac{m \cdot \ell_0}{ES}}$

keyingi holatda ham davr o'zgarmaydi.

$\frac{T_1}{T_2} = 1$ (A)

23)



$tg 1^\circ = \frac{h}{60}$.

$h = 60 \cdot tg 1^\circ = 1 m$. (A)

24) (A) 25) (A) 26) (A)

27) $m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}} = \frac{m_0}{\sqrt{1 - 0,2^2}} = 1,02 m_0$ (D)

28) (B) 29) (B) 30) (B).

26-variant.

1) $\frac{\frac{g}{2}(2 \cdot 8 - 1)}{\frac{g}{2}(2n - 1)} = 5$.

$2n - 1 = 3$. $n = 2$. (C)

2) (C)

3) $v_0 = 20 m/c$.
$v = 5 m/c$.
$Fq = 20$.
$m = 2 kg$
$\ell = ?$

$\frac{m v_0^2}{2} - \frac{m v^2}{2} = Fq \cdot \ell$

$5^2 - 0 = 5 \cdot \ell$

$\ell = 5 m$.

(B)

26-variant

4) $\begin{cases} mg = 90 \\ mg - ma = 84 \end{cases}$ $m = 9\ kg$, $ma = 6$. $a_1 = \frac{2}{3} m/s^2$. (D)

5) $m = 1{,}2 \cdot 10^3\ kg$, $R = 500\ m$, $v = 20\ m/s$. $F_n = ?$

$F_n = ma = 1{,}5 \cdot 10^3 \cdot \frac{400}{500} =$

$= 0{,}188 \cdot 10^3 = 0{,}188\ kN$ (A)

6) (B)

7) $m = 0{,}2\ kg$, $h = 2\ m$, $t = 0{,}4\ s$. $\Delta Q = ?$

$h_x = \frac{gt^2}{2} = 5 \cdot 0{,}4^2 = 0{,}8$.

$\Delta Q = mg(h - h_x) = 2 \cdot (2 - 0{,}8) =$

$= 2{,}4$. (A)

8) (B) 9) (D)

10) $P = 80 \cdot 10^3\ Pa$, $V_1 = 0{,}101\ m^3$, $V_2 = 0{,}10272\ m^3$. $A = ?$

$PV = const$.

$A = P_1 V_1 \ln \frac{V_2}{V_1} = 800$. (B)

11) (A)

12) $0{,}6v - 2v = -1{,}4v$ (minus ishora organa harak. bildiradi)

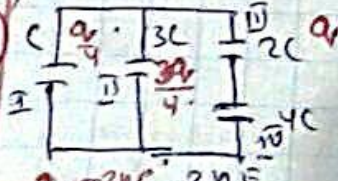
(B)

13) $q = 10^{-8}\ C$

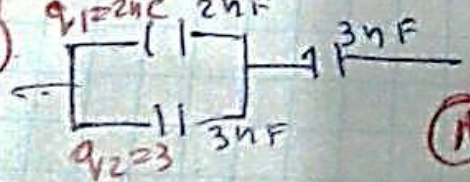
$\varphi_7 - \varphi_{32} = \frac{kq}{R_7} - \frac{kq}{R_{32}} = 9 \cdot 10^9 \cdot 10^{-8} \left(\frac{1}{5} - \frac{1}{2} \right) =$

$= 90 \cdot (0{,}2 - 0{,}5) = -27$. (B)

14) (B)

15) 

$\frac{q_1}{q_4} = \frac{1}{4}$. (C)

16) 

$q_3 = q_1 + q_2 = 5nC$

(A)

26-variant

17) (D)

18) $U = 120V$
$R = 5 \cdot 10^3 \Omega$
$U_x = 80V$
$U_2 = 50V$
$R_2 = ?$

$I \cdot R_V = 80$. $\quad I = \frac{40}{5 \cdot 10^3} = 8 \cdot 10^{-3}$.

$R_V = \frac{80 \cdot 10^3}{8} = 10 \cdot 10^3 \Omega$

$I \cdot 10 \cdot 10^3 = 50$.
$I = 5 \cdot 10^{-3}$. (A)

$5 \cdot 10^{-3} \cdot R = 70$. $\quad R = 14 K\Omega$

19) $E_b = 5,2 eV = 5,2 \cdot 1,6 \cdot 10^{-19} = 8,32 \cdot 10^{-19} J$.

$\vartheta = \frac{N}{N_A} \Rightarrow N = 1 \cdot 6 \cdot 10^{23} = 6 \cdot 10^{23}$ ta.

1 ta $\longrightarrow 8,32 \cdot 10^{-19}$
$6 \cdot 10^{23}$ ta $\longrightarrow E_x$ (A)
$E_x = 500 kJ$

20) (C)

21) (A) 22) (A) 23) (B) 24) (B) 25) (B)

26) $\begin{cases} \frac{\sin\alpha}{\sin\beta} = \frac{n_2}{n_1} = \frac{2 \cdot \sqrt{2}}{\sqrt{13}} \\ \frac{\sin\beta}{\sin\varphi} = \frac{n_3}{n_2} = \frac{\cdot 1 \cdot \sqrt{13}}{\sqrt{2} \cdot 2} \end{cases}$ $\quad \frac{n_3}{n_1} = 1$. (A)

27) (A) 28) C 29) (A) 30) (B)

27-variant

1) $v_0 = 1,67 m/c$.
$h = \frac{v_0^2}{2g} = \frac{1,67^2}{2 \cdot 1,67} = \frac{1,67}{2} = 0,1835 = 83,5 sm$ (D)

2) $H = \frac{gt^2}{2} = 40$ 2) $t = 2\sqrt{2}$. (B)

3) $\frac{mv^2}{2} - 0 = \frac{kq}{2} \cdot R \Rightarrow t = \infty$ (D)

4) $m=0{,}5$ kg, $\vartheta=30$ m/s, $t=?$

$\vartheta = gt = mgt$

$t = \frac{30}{5} = 6$ s. (B)

5) $R=3$ m, $r=1$ m

6) Ortadi (B) 7) (A)

8) $h=5$ m.

$mgh = \frac{m\vartheta^2}{2}$ $\quad \vartheta = \sqrt{2 \cdot 10 \cdot 5} = 10$ m/s (A)

9) (A) 10) C. 11) (A)

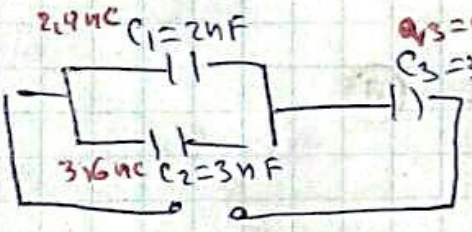
12) $\frac{3}{2}\vartheta RT + \vartheta RT = 2500$.

$2{,}5\vartheta RT = 2500 \Rightarrow \vartheta RT = 1000$.

$A_T = -1000$ J. (D)

13) $\frac{E_{16}}{E_{43}} = \frac{kq \cdot R_{43}^2}{R_{16}^2 \cdot kq} = \frac{17}{20}$ (D) 14) (D)

15)



(A)

16) $E = 20$ V/m.

$\vartheta = 1{,}6 \cdot 10^6$ m/s.

$t = 1{,}66 \cdot 10^{-3}$ s

$m = 1{,}66 \cdot 10^{-27}$

$\vartheta x = ?$

$Eq = ma$.

$a = \frac{20 \cdot 1{,}6 \cdot 10^{-19}}{1{,}66 \cdot 10^{-27}} = 19{,}3 \cdot 10^8$ m/s²

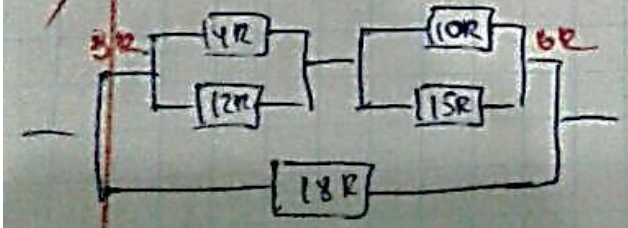
$\vartheta_x = \vartheta_0 - at =$

$= 1{,}6 \cdot 10^6 - 19{,}3 \cdot 10^8 \cdot 1{,}66 \cdot 10^{-3} =$

$= -1{,}6 \cdot 10^6$ m/s.

$|\vartheta x| = 1{,}6$ Mm/s (D)

17) Sxemani soddalashtiramiz:



$\frac{1}{R_1} = \frac{1}{4R} + \frac{1}{12R}$ $\quad R_1 = 3R$

$\frac{1}{R_{um}} = \frac{1}{18R} + \frac{1}{9R} = \frac{1}{6R}$ (D)

$R_{um} = 6R$

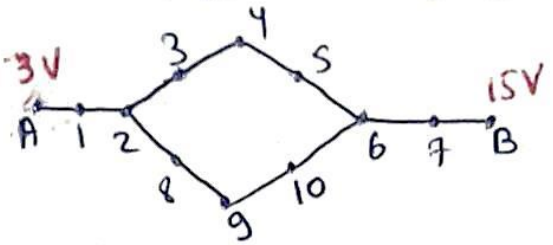
18) $E_b = 3{,}2 \cdot 1{,}6 \cdot 10^{-19} = 5{,}12 \cdot 10^{-19}$ J.

$1 \longrightarrow 5{,}12 \cdot 10^{-19}$.

$6 \cdot 10^{23} \longrightarrow E$.

$E = 309$ kJ (A)

19)



$\frac{\varphi_1}{\varphi_6} = ?$

$\begin{cases} 3 - \varphi_1 = J \cdot R. \\ \varphi_6 - 15 = J \cdot 2R \end{cases}$ $\begin{cases} \varphi_1 = 3 - JR = 5 \\ \varphi_6 = 15 + 2JR = 11. \end{cases}$

$J \cdot 6R = -12$

$JR = -2$.

$\frac{\varphi_1}{\varphi_6} = \frac{5}{11}$ (B)

20) A 21) B 22) A 23) C 24) B

25) C 26) D.

27) $m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}} = \frac{m_0}{0{,}6} = \frac{5m_0}{3}$. (D)

28) D

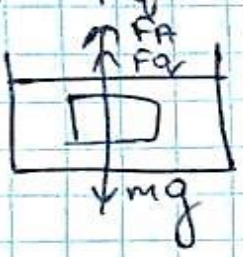
29) A

30) A

28-variant.

1) $l = \frac{2+6}{2} \cdot 12 + \frac{10+12}{2} \cdot 1 = 48 + 11 = 59$ (A)

2) $F_q = k\theta$



$F_A + F_q = mg$

$F_A + k\theta = mg$

$F_A + F = F_q + m\theta$

$F = F_q + m\theta - F_A = k \cdot 2\theta + m\theta - mg - k\theta$

$= k\theta + m\theta - mg = 3mg$ (C)

3) $H = \frac{gt^2}{2} = 5t^2 = 20m$ (D)

4) (C)

5) $T_x = \frac{T}{2\sqrt{2}} = \frac{365}{2\sqrt{2}} = 129$. (A)

$\left(\frac{T_1}{T_2}\right)^2 = \left(\frac{R_1}{R_2}\right)^3$

6) (D)

7) $E_{K1} = \frac{m\theta_1^2}{2} = \frac{GmM}{2(R+4)} = \frac{GmM}{12R}$.

$E_{K2} = \frac{m\theta_2^2}{2} = \frac{GmM}{2(R+2R)} = \frac{GmM}{6R}$. (A)

8) $M_1 = M_2$.

$15 \cdot 2 = F_2 \cdot 22$. (A)

$F_2 = 7{,}5$.

9) $-\frac{3}{2} \vartheta R \Delta T = 16{,}6$ (A)

$\Delta T = -0{,}33\ K$

10) $\frac{5}{2} \vartheta R \Delta T = 21$.

$\vartheta R \Delta T = 8{,}4$. (A)

12,6 kJ và 8,4 kJ.

11) (A)

28-variant

12) $q_1 = 3q$ $q_2 = 4q$.

$F_1 = \frac{k \cdot 12q^2}{R^2}$

$F_2 = \frac{k \cdot 12q^2}{R^2}$

Tekshirib avvalgi vaziyatga qaytarilsa, $4q$ va $3q$ bo'lib qoladi.

$F_1 = F_2$ (A)

13) (C) 14) (A) 15) (A)

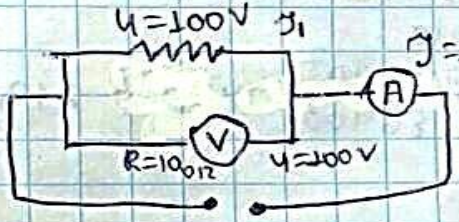
16) $E = 20 V/m$.
$v = 1600 \cdot 10^3 m/s$.
$t = 1{,}166 \cdot 10^{-3} s$
$m = 1{,}166 \cdot 10^{-27} kg$
$v_x = ?$

$Eq = ma$.
$a = \dots$

$v_x = v_0 - at = 1{,}6 \cdot 10^6 - 1{,}66 \cdot 10^{-3} \cdot 10^9 = 0$ (C)

17) (A)

18) $R_V = 100 \Omega$
$U_V = 100 V$
$I_A = 1{,}2 A$
$R_L = ?$



$I_1 + \frac{100}{100} = 1{,}2$ $I_1 = 0{,}2 A$.

$R_x = \frac{U}{I_1} = \frac{100}{0{,}2} = 500 \Omega$ (A)

19) Ortadi (A) 20) (B)

21) (A) 22) (A)

23) $\frac{I_0}{2} = I_0 \cos^2 \alpha \Rightarrow \cos \alpha = \frac{1}{\sqrt{2}}$ $\alpha = \frac{\pi}{4}$. (D)

24) $\begin{cases} \frac{n_2}{n_1} = \frac{\sin \alpha}{\sin \beta} = \frac{1 \cdot \sqrt{5}}{\sqrt{2} \cdot 1} = \frac{\sqrt{5}}{\sqrt{2}} \\ \frac{n_3}{n_2} = \frac{1 \cdot \sqrt{13}}{\sqrt{2} \cdot 2} = \frac{\sqrt{13}}{2\sqrt{2}} < 1 \end{cases}$

$\frac{n_3}{n_1} = \frac{\sqrt{5} \cdot \sqrt{13}}{4} = \frac{\sqrt{65}}{4}$ (B)

28-variant

25) $R = 0{,}1\,m$

$\Phi = 400\pi\ lm$

$I = ?$

$I = \frac{\Phi}{\Omega} = \frac{400\pi}{4\pi} = 100\ cd$ (D)

26) (A)

27) $\vartheta_{nis} = \frac{\vartheta_1 - \vartheta_2}{1 - \frac{\vartheta_1\vartheta_2}{c^2}} = \frac{0{,}9c - 0{,}8c}{1 - \frac{0{,}72c^2}{c^2}} = 0{,}36c$ (C)

28) (C) 29) (C)

30) $T = 14{,}3$ sutka

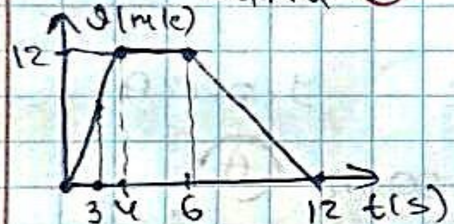
$t = T \cdot 1{,}44 = 14{,}3 \cdot 1{,}44 = 20{,}6$ sutka (C)

29-variant.

1) 360 km/h = 100 m/c.

$\vartheta = \frac{2\pi R}{T}\cos\alpha = \frac{2\pi \cdot 4 \cdot 10^7}{86400}\cos 41^\circ = 2194\ m/c$.

katta (B)

2) 

$\frac{3}{\vartheta} = \frac{4}{12}$. $\ell = \frac{3 \cdot 9}{2} = 13{,}5$

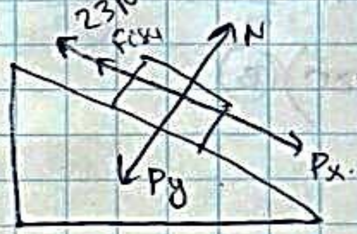
$\vartheta = 9\,m/c$. (A)

3) $\sin\alpha = 0{,}6$.

$m = 8\,kg$.

$F = 23N$

$\mu = 0{,}5$



$F_1 = 23 + F_{ish} = 23 + \mu mg\cos\alpha = 23 + 5 \cdot 8 \cdot 0{,}8 = 55N$.

$F_2 = P_x = mg\sin\alpha = 80 \cdot 0{,}6 = 48N$.

yetadi. (B)

4) (C)

5) $\sigma = 0{,}4E$

$\varepsilon = 0{,}4$.

$\frac{\Delta\ell}{\ell_0} = 0{,}4$ $\Delta\ell = 0{,}4\ell_0$. $\ell - \ell_0 = 0{,}4\ell_0 \Rightarrow \ell = 1{,}4\ell_0$. (A).

29-variant

7) $F_1 \cdot 2 = F_2 \cdot R$.

$F_1 \cdot 2 = 45 \cdot 5$

$F_1 = 225$ (A)

8) $E_{P1} = \left(-\frac{GmM}{R+5R}\right) =$

$= \left(-\frac{GmM}{6R}\right)$

$E_{P2} = \left(-\frac{GmM}{R+2R}\right) = \left(-\frac{GmM}{3R}\right)$

(B)

9) 2 mărită

$-\frac{5}{2} \cdot 2 \cdot 8{,}31 \cdot \Delta T = 1616$.

$\Delta T = -\frac{1616}{5 \cdot 8{,}31} = -0{,}4$. (A)

10) $\vartheta = 1$ mol.

$T = 100$ K.

$V_1 = 0{,}01 \text{ m}^3$

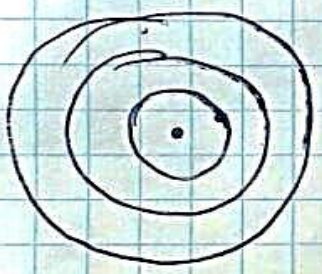
$V_2 = 0{,}0272 \text{ m}^3$

$A = ?$

$A = \vartheta RT \ln \frac{V_2}{V_1} = 1 \cdot 8{,}31 \cdot 100 \ln 2{,}72$

$= 831$ (B)

11)



$r_1 = 0{,}5$.

$r_2 = 0{,}75$.

$r_3 = 1{,}5$

$\varphi_1 = \frac{kq}{r_1} = \frac{kq}{0{,}5} = 2kq$

$\varphi_2 = \frac{kq}{0{,}75} = \frac{4}{3}kq$

$\varphi_3 = \frac{kq}{1{,}5} = \frac{2}{3}kq$.

(A)

$\varphi_1 - \varphi_2 = \frac{2}{3}kq$

$\varphi_2 - \varphi_3 = \frac{2}{3}kq$.

12) (D)

13) $\vartheta = 0{,}8C$.

$\vartheta_n = 0 - 0{,}8C = -0{,}8C$ (A)

14)

$\frac{q^2}{2C} = W$ $C_1 = \frac{q^2}{2W}$.

$\frac{4q^2}{2C_2} = 3W$ $C_2 = \frac{2q^2}{3W}$.

$W_{nat} = \frac{q_n^2}{2C_n} = \frac{q^2}{2 \cdot \left(\frac{q^2}{2W} + \frac{2q^2}{3W}\right)} = \frac{6W \cdot q^2}{2 \cdot 7q^2} =$

$= \frac{3}{7}W$.

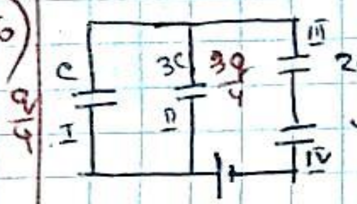
(C)

$W_{nat} = ?$

15) $\varepsilon = 5V$

$r = 1\Omega$ (A)

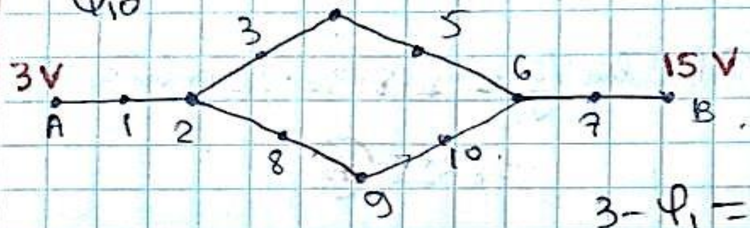
$I = \frac{\varepsilon}{r} = 5A$

16) 

$\frac{q_1}{q_2} = \frac{q\cdot 4}{4\cdot 3q} = \frac{1}{3}$ (C)

17) $\varphi_A = 3V$ $\varphi_B = 15V$

$\frac{\varphi_1}{\varphi_{10}} = ?$



$3 - 15 = I \cdot 6R$

$IR = -2$

$3 - \varphi_1 = I \cdot R$

$\varphi_1 = 3 - IR = 5$

$\varphi_6 - 15 = I \cdot 2R$

$\varphi_6 = 11$

$\varphi_{10} - \varphi_6 = \frac{I}{2} \cdot R$

$\varphi_{10} = 11 - 1 = 10$

$\frac{\varphi_1}{\varphi_{10}} = \frac{5}{10} = \frac{1}{2}$ (B)

18) (A)

19) (D).

20) $R_{um1} = \frac{2R}{3}$. $R_{um2} = 2R$.

3 marta ↑ (A)

21) (A) 22) $T_2 > T_1$ (A)

23) $d = 6\cdot 10^{-6} m$.

$\Delta\varphi = 4$.

$\lambda = 3\cdot 10^{-6} m$

$\alpha = ?$

$\Delta\varphi = \frac{2\pi \Delta l}{\lambda} = \frac{2\pi d \sin\alpha}{\lambda}$

$\Delta l = d \sin\alpha$

$\sin\alpha = \frac{4\cdot 3\cdot 10^{-6}}{2\pi \cdot 6\cdot 10^{-6}} = \frac{1}{\pi} = \frac{\pi}{\pi^2} = \frac{\pi}{10}$ (D)

29 - Variant.

24) (B)

25) $I = 200\ cd$, $R = 0{,}2\ m$, $E_m = ?$

$E_{max} = \frac{I}{R^2} = \frac{200}{4 \cdot 10^{-2}} = 5000$ (A)

26) (D)

27) $\vartheta_{mis} = \frac{0{,}9c + 0{,}9c}{1 + 0{,}81} = \frac{1{,}8c}{1{,}81} = 0{,}99c$ (B)

28) (A)

29) $E = \frac{-13{,}6}{n^2} \Rightarrow \frac{-13{,}6}{10^4} \approx 0$. (A)

30) $T = 12{,}8\ soat$

$t = T \cdot 1{,}44 = 12{,}8 \cdot 1{,}44 = 18{,}4$. (D)

30 - Variant

1) $\sin\alpha = 0{,}6$, $m = 8\ kg$, $F = 84\ N$, $\mu = 0{,}5$

$F_1 = F_{fis} + 84 = 0{,}5 \cdot 80 \cdot 0{,}8 + 84$

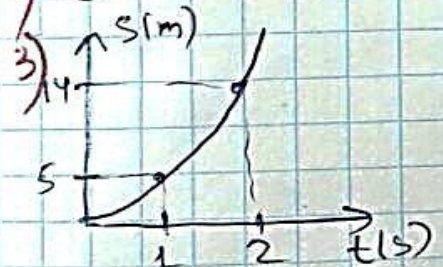
$= 32 + 84 = 116$.

$F_2 = mg\sin\alpha = 80 \cdot 0{,}6 = 48\ N$

(C)

2) (A)

3)



$S = \vartheta_0 t + \frac{at^2}{2}$.

$\begin{cases} 5 = \vartheta_0 + \frac{a}{2} \\ 14 = 2\vartheta_0 + 2a \end{cases}$

$\begin{cases} \vartheta_0 + \frac{a}{2} = 5 \\ \vartheta_0 + a = 7 \end{cases}$

$a = 4$.

$\vartheta_0 = 3$. (D)

4) $h = 5t^2 = 60$.

$t = 2\sqrt{3}$.

$\frac{2\vartheta_0 \sin\alpha}{g} = 2\sqrt{3}$.

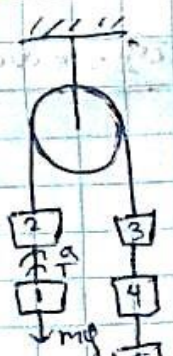
$\vartheta_0 \cdot \frac{\sqrt{3}}{2} = 10\sqrt{3}$

$\vartheta_0 = 20\ m/s$. (D)

5) $m \cdot 5g - (-m \cdot 20) = 10$.

$m = \frac{10}{70} = \frac{1}{7}\ kg = 143\ g$ (A)

30- Varia

6) 

$$a = \frac{(m_2 - m_1)}{m_2 + m_1} g = \frac{3m - 2m}{3m + 2m} \cdot g = \frac{g}{5}.$$

$$T = m(g + a) = \frac{m \cdot 6g}{5} \quad (A)$$

7) $$E_1 = \left(-\frac{GmM}{6R}\right) + \frac{GmM}{12R} = -\frac{GmM}{12R}$$

$$E_2 = \left(-\frac{GmM}{3R}\right) + \frac{GmM}{6R} = -\frac{GmM}{6R}.$$

(B)

8) 2 mola ↓

$$F_1 \ell_1 = F_2 \ell_2.$$

$$F_1 \cdot 2 = 45 \cdot 3.$$

$$F_1 = 135\,N \quad (C)$$

9) $Q = 4\,mol$.

$A = 166\,J$.

$\Delta T = ?$

$$\frac{5}{2} Q R \Delta T = 166.$$

$$\Delta T = \frac{2 \cdot 166}{5 \cdot 4 \cdot 8{,}31} = 2 \quad (A)$$

10) $V_1 = 0{,}01\,m^3$.

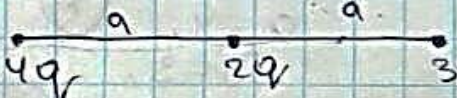
$V_2 = 0{,}0272\,m^3$.

$P = 100 \cdot 10^3\,Pa$.

$A = ?$

$$A = P_1 V_1 \ln \frac{V_2}{V_1} = 10^3. \quad (A)$$

11) (A)

12) 

$$\frac{K \cdot 12q^2}{2a} + \frac{K \cdot 6q^2}{a} = \frac{mv^2}{2}.$$

$$\frac{12Kq^2}{a} = \frac{mv^2}{2}$$

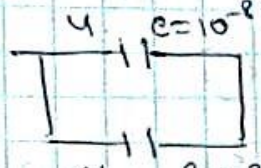
$$v^2 = \frac{24Kq^2}{ma}.$$

$$v = 2q\sqrt{\frac{6K}{ma}}. \quad (A)$$

30-variant

13) $2\varphi - \frac{\varphi}{2} = \frac{3\varphi}{2}$ (D)

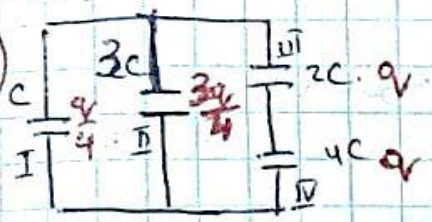
14) $C = 10^{-8}$ F.
$q = 2 \cdot 10^{-7}$ C.
$C_x = 3 \cdot 10^{-8}$ F
$U_1 = ?$



$U \cdot 10^{-8} U = 2 \cdot 10^{-7}$
$U = \frac{20}{4} = 5$ V.
$U_1 = \frac{q}{C} = 20$ V
4 marta ↓ (A)

15) (B)

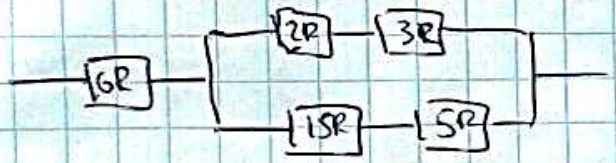
16)



$\frac{q_2}{q_3} = \frac{3q}{4 \cdot q} = \frac{3}{4}$. (C)

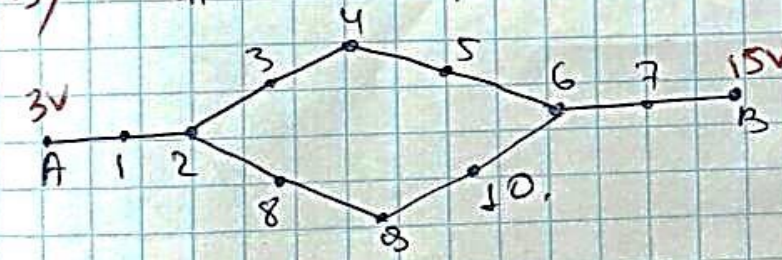
17) (D)

18) Sxemani soddalashtiramiz:



$R_1 = 5R$ $R_2 = 20R$. (C)
$\frac{1}{R_3} = \frac{1}{5R} + \frac{1}{20R} = \frac{1}{4R}$. $R_3 = 4R$ $R_4 = 6R + 4R = 10R$

19) $\varphi_A = 3$V $\varphi_B = 15$V. $\varphi_5 = ?$



$\varphi_6 + 15 = 9 \cdot 2R$.
$3 - 15 = 9 \cdot 6R$
$9R = -2$.
$\varphi_6 = 15 - 4 = 11$.

$\varphi_5 - \varphi_6 = \frac{9R}{2} = -1$
$\varphi_5 = 10$. (B)

20) $R_{yum_1} = R$.
$R_{yum_2} = 2R \Rightarrow$ 2 marta ↑ (C)

21) (C) 22) (B)

30-variant

23) $d = 5 \cdot 10^{-6}$ m.
$R = 2 \cdot 10^{-6}$ m
$\Delta\varphi = ?$

$\Delta\varphi = \frac{2\pi\rho}{R} = \frac{2\pi \cdot 5 \cdot 10^{-6} \cdot \frac{\pi}{20}}{2 \cdot 10^{-6}} = \frac{50}{20} = 2{,}5$

(D)

24) $R = 8 \cdot 10^{-2}$ m.
$E = 18$ lx.
$R_x = 12 \cdot 10^{-2}$ m.
$E_x = ?$

$E_x = \frac{ER}{R_x^2} = \frac{18 \cdot 8}{144} = 1$.

(A)

25) $S = 2 \cdot 10^{-4}$ m^2.
$t = 10$ s.
$W = 300$ J
$E = ?$

$E = \frac{W}{S \cdot t} = \frac{600}{2 \cdot 10^{-3}} = 300 \cdot 10^3$.

(C)

26) (A). 27) (A)

28) (B)

29) $10^{20} = 16 \cdot 10^{20} \cdot 2^{-\frac{t}{2}}$

(C)

$t = 8$.

30) (A)

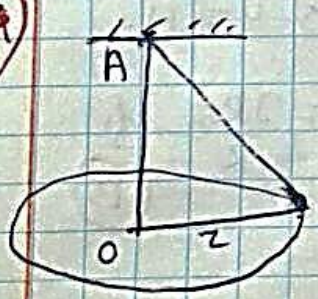
31-variant

1) $a_n = 0$, $a_\tau = 0$. (A)

2) (C)

3) (D)

4)



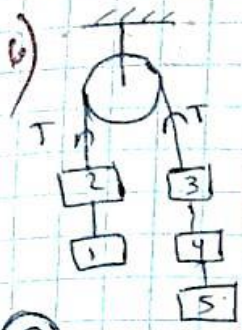
$m = 0{,}5$ kg
$\vartheta = 2$ m/s
$r = 0{,}5$ m
$F_n = ?$

$F_n = \frac{m\vartheta^2}{R} = \frac{0{,}5 \cdot 4}{0{,}5} = 4$.

(B)

5) (B)

31-variant

6) 

$a = \frac{m_2 - m_1}{m_2 + m_1} \cdot g = \frac{3m - 2m}{3m + 2m} \cdot g = \frac{g}{5}$

$T - 2mg = 2ma$

$T = 2m \cdot \frac{68}{5} = \frac{12mg}{5}$ (B)

7) (D) 8) (A)

9) $q_1 = q_2$.

$d_2 = 1{,}1\, d_1$.

$\frac{W_1}{W_2} = \frac{q_1^2 \cdot \frac{1}{C_2}}{\frac{1}{C_1} \cdot q_2^2} = \frac{\varepsilon\varepsilon_0 S \cdot d_2}{d_1 \cdot \varepsilon\varepsilon_0 S} = 1{,}1$ (A)

10) (D)

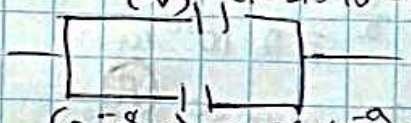
11) $F = \frac{k q_1 q_2}{R} = \frac{9 \cdot 10^9 \cdot \frac{8 \cdot 10^{-8}}{3}}{2} = \frac{240}{3} = 80$. (A)

12) $C_1 = 1{,}5 \cdot 10^{-9}$ F.

$q_1 = 3 \cdot 10^{-8}$ C.

$C_2 = 3 \cdot 10^{-9}$ F.

$\Delta U = ?$



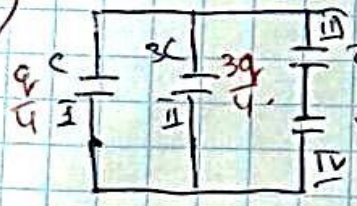
$q_1 = q_2$.

$\frac{q}{1{,}5 \cdot 10^{-9}} = \frac{3 \cdot 10^{-8} - q}{3 \cdot 10^{-9}}$

$q = 10^{-8}$.

$U = \frac{q}{C_1} = \frac{10^{-8}}{1{,}5 \cdot 10^{-9}} = \frac{10 \cdot 2}{3} = 6{,}67$.

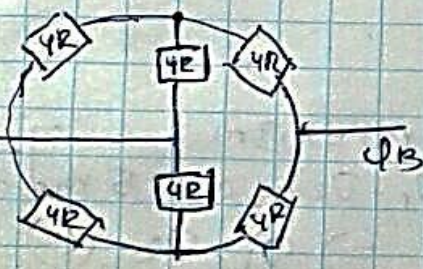
13) 3marta ↓ (A)

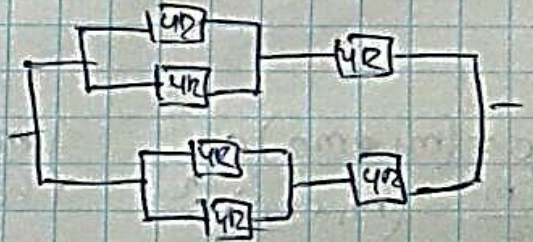


I da eng ↓

eng ↑ ⟶ III va IV (A)

14) (A)

15) 



$R_{4m1} = 6R$

$R_{4m2} = 6R$

$R_3 = \frac{6R}{2} = 3R$.

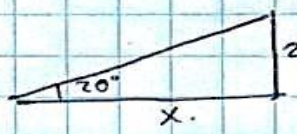
(D)

16) (A)

17) (B) 18) (B)

19) $J = \frac{J_0 \cos^2\alpha}{2} = \frac{J_0}{2}\cos^2 60 = \frac{J_0}{8}$ (A)

20) $\alpha = 20°$.
$h = 2m$.
$J = 2000cd$.
$E = ?$



$x = 2ctg20° = 5,5m$.

21) $I = \sigma \cdot T^4$ (D)

22) $E_K = 0,1 m_0c^2$.

$E_T = E_K + E_{tinch} = 0,1m_0c^2 + m_0c^2 = 1,1m_0c^2$ (A).

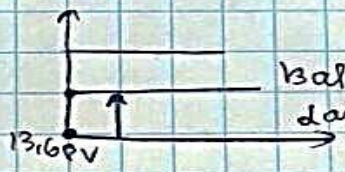
23) (C)

24) $N = 16 \cdot 10^{20} \cdot 2^{-\frac{8}{2}} = 2 \cdot 10^{20}$ ta.

$\Delta N = 16 \cdot 10^{20} - 2 \cdot 10^{20} = 14 \cdot 10^{20}$ (A).

25) $E = 13,6 eV$.

$0,25E = 3,4 eV$.



(A)

mumkin

26) $P = \frac{h}{2\pi} \cdot n = \frac{11h}{2\pi}$ (D)

27) (C)

28) $^{0}_{0}\gamma + {}^{0}_{-1}\beta = {}^{0}_{-1}K$ (C).

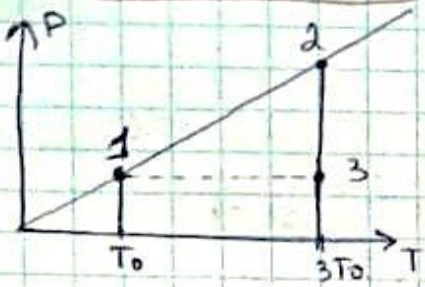
29) (B)

30) $\begin{cases} 0,3m\,c = (m_1 + m_2)c. \\ \frac{(0,3c)^2 m}{2} = (m_1 + m_2)c^2 \end{cases}$ $\begin{cases} m_1 - m_2 = 0,3m. \\ h(\nu_1 - \nu_2) = 0,045\,m_0 \end{cases} \Rightarrow$

$\Rightarrow \nu_1 > \nu_2$. (C).

35-variant

Variant 16 – 12:



$Q_1 = A_1 = 6{,}4\ kJ$.

$T_0 = 160\ K$.

$\nu R \cdot 3T_0 \ln \frac{V_3}{V_2} = 6400$

$\ln \frac{V_3}{V_2} = \frac{6400}{480 \cdot 8{,}31}$

$Q = \frac{3}{2}\nu R \cdot 2T_0 = 3 \cdot 8{,}31 \cdot 160 = 480 \cdot 8{,}31 = 3989$

$\frac{A}{Q} = \frac{6400}{6400 + 3989} = 0{,}62$ ©

21 - Variant – 15

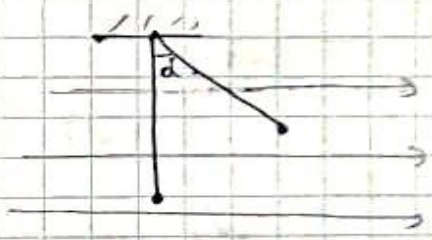
$E = 10^5\ V/m$.

$l = 1\ m$.

$q = 10^{-6}\ C$.

$m = 10^{-7}\ kg$

$E_{k\,max} = ?$



$tg\,\alpha = \frac{F}{mg} = \frac{Eq}{mg} = 1$

$\alpha = 45°$.

$E_{k\,max} = E_{p\,max} = mgl(1 - \cos\alpha) =$

$= 0{,}1\left(1 - \frac{1}{\sqrt{2}}\right) = 30\ mJ$.

21 - variant – 30

$d = 2R = 10^{-15}$

$R = \frac{10^{-15}}{2}$

$m = 1{,}7 \cdot 10^{-27}\ kg$

$\rho = ?$

$\rho = \frac{m}{V} = \frac{m}{\frac{4}{3}\pi R^3} = \frac{1{,}7 \cdot 10^{-27}}{\frac{4}{3}\pi \cdot \frac{10^{-45}}{8}} =$

$= 3{,}2 \cdot 10^{18}$.

Tartibi desa 10^{18} bolardi ©

23-variant-2

$\beta = 12\pi - 3\pi t$ $\qquad 12\pi - 3\pi t = 0 \Rightarrow \boxed{t = 4s}$

$\omega_0 = 10\pi$ rad/s

$\omega = \int \beta = 12\pi t - \frac{3\pi t^2}{2} + 10\pi$

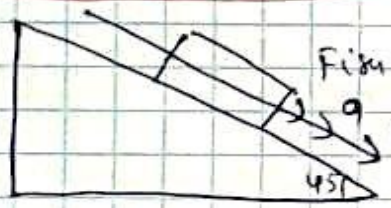
$\omega = \frac{\Delta\varphi}{t}$

$\Delta\varphi = \int \omega = \int \left(12\pi t - \frac{3\pi t^2}{2} + 10\pi\right) dt = 6\pi t^2 - \frac{\pi}{2} t^3 + 10\pi t$

$\omega = \frac{\Delta\varphi}{t} = \frac{6\pi t^2 - \frac{\pi}{2} t^3 + 10\pi t}{t} = 6\pi t - \frac{\pi}{2} t^2 + 10\pi =$

$= 6\pi \cdot 4 - \frac{\pi}{2} \cdot 16 + 10\pi = 34\pi - 8\pi = 26\pi$ (D)

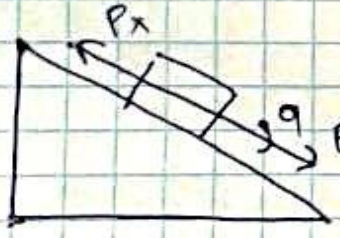
23-variant-4



$F_{ish} + P_x = ma_1$

$a_1 = \frac{mg(M\cos\alpha + \sin\alpha)}{m} =$

$= g \cdot \frac{\sqrt{2}}{2}(M+1)$



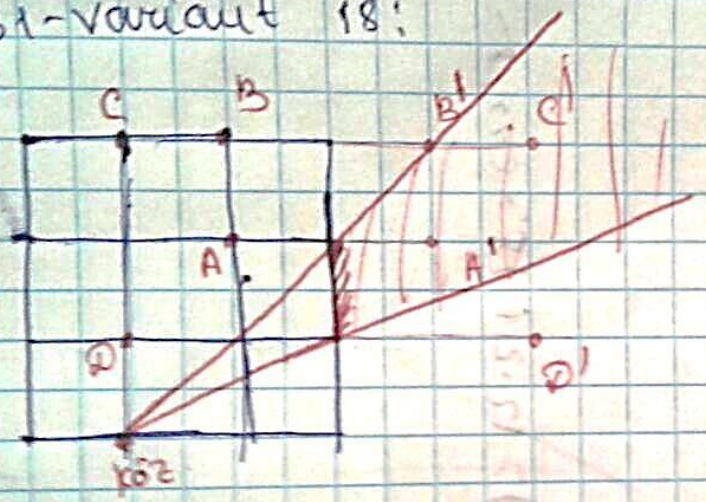
$F_{ish} - P_x = ma_2$

$a_2 = g \cdot \frac{\sqrt{2}}{2}(M+1) = g \cdot \frac{\sqrt{2}}{2}(1-M)$

$\frac{a_1 t_1^2}{2} = \frac{a_2 t_2^2}{2}$

$\frac{t_2}{t_1} = \sqrt{\frac{a_1}{a_2}} = \sqrt{\frac{M+1}{1-M}} = 3.$ (A)

3.1-variant 18:



A'; B'; C' ni kórq oladi (B)