Часть 1

Олимпиада: **Физика, 11 класс (1 часть)**

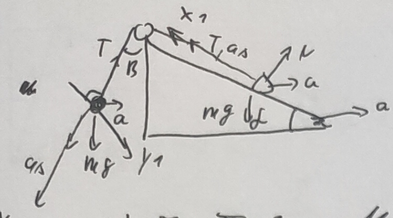
Шифр: **21202150**

ID профиля: **801354**

Вариант 5

Чистовик

1.



1) Нить не растяжима:

$T = const;\ a_{\text{л}} = const$

2) По II Зак. Ньютона:

$y_1: ma\cos\beta \cdot 13 = 13mg\sin\beta \Rightarrow \underline{a = g\dfrac{\sin\beta}{\cos\beta} = g\,tg\,\beta}$

$y_2: a_{\text{л}} \cdot 13m = 13mg\cos\beta - T \Rightarrow a_{\text{л}} = g\cos\beta - \dfrac{T}{13m}$

$x_1: T - mg\sin\alpha = ma_{\text{л}} - a\cos\beta = ma_{\text{л}} - g\sin\beta \cdot m$

$T - mg\sin\alpha = mg\cos\beta - \dfrac{T}{13} - g\sin\beta \cdot m$

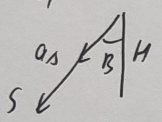
$\dfrac{T}{13m} = \dfrac{g}{12}(\sin\alpha + \cos\beta - \sin\beta)$

$a_{\text{л}} = g\cos\beta - \dfrac{g}{12}(\sin\alpha + \cos\beta - \sin\beta)$

$\cancel{a_{\text{л}} = (\tfrac{11}{12}\cos\beta -}$

$\underline{a_{\text{л}} = \dfrac{g}{12}(11\cos\beta - \sin\alpha + \sin\beta)}$

3)



$S = \dfrac{H}{\cos\beta}$

$S = v_0 t + \dfrac{at^2}{2}$

$\dfrac{H}{\cos\beta} = \dfrac{a_{\text{л}} t^2}{2}$

$t = \sqrt{\dfrac{2H}{a_{\text{л}} \cdot \cos\beta}} = \sqrt{\dfrac{24H}{g\cos\beta(11\cos\beta - \sin\alpha + \sin\beta)}}$

Ответ: 1) $a = g \cdot tg\,\beta$

2) $a_{\text{л}} = \dfrac{g}{12}(11\cos\beta - \sin\alpha + \sin\beta)$

3) $t = \sqrt{\dfrac{24H}{g\cos\beta(11\cos\beta - \sin\alpha + \sin\beta)}}$

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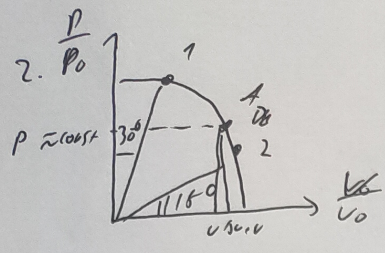
Чистовик

2. 

1) По ур. Менд-Клап: $pV = \nu RT$

$T_1 = \frac{p_1 V_1}{\nu R}$ $T_2 = \frac{p_2 V_2}{\nu R}$

2) $tg\,15^\circ = \frac{V_0 p_2}{p_0 V_2}$; $tg\,60^\circ = \frac{V_0 p_1}{p_0 V_1}$; $tg\,30^\circ = \frac{p_0}{p_1} \cdot \frac{V_1}{V_0}$

3) окружность $\Rightarrow$ $\frac{p^2}{p_0^2} = \frac{V^2}{V_0^2} = R^2 = \frac{V_1^2}{V_0^2} + \frac{p_1^2}{p_0^2} = \frac{V_2^2}{V_0^2} + \frac{p_2^2}{p_0^2}$

$(V_1 p_0)^2 + (p_1 V_0)^2 = (V_2 p_0)^2 + (V_0 p_2)^2$

$p_0^2 (V_1^2 - V_2^2) = V_0^2 (p_2^2 - p_1^2)$

4) $tg\,30^\circ \cdot tg\,15^\circ = \frac{V_1}{p_1} \cdot \frac{p_2}{V_2} = \frac{p_2 V_1}{V_2 p_1}$

$\frac{p_2}{p_1} = tg\,30^\circ \cdot tg\,15^\circ \cdot \frac{V_2}{V_1}$

$\frac{\frac{V_1}{V_0}}{\frac{V_2}{V_0}} = \frac{V_1}{V_2} = \frac{R \cdot ctg\,60^\circ}{R\,ctg\,15^\circ} = tg\,30^\circ \cdot tg\,15^\circ$

$\frac{T_1}{T_2} = \frac{V_2^2}{V_2^2} \cdot (tg\,30^\circ \cdot tg\,15^\circ) = \frac{p_1 V_1}{p_2 V_2}$

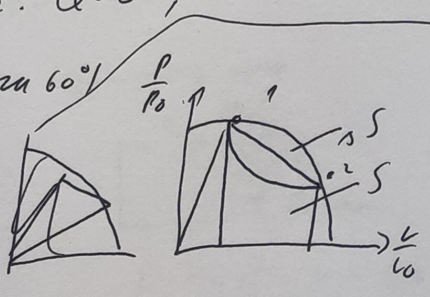
$\frac{T_1}{T_2} = tg\,15^\circ \cdot tg\,30^\circ$

5) $C_A = \frac{Q}{\nu \Delta T} = \frac{\Delta(p_A V) - \frac{3}{2}\nu R \Delta T}{\nu \Delta T} = 0 \Rightarrow \Delta(p_A V) = A_z = \frac{3}{2}\nu R \Delta T \Rightarrow \frac{3}{2} p_A V = p_A V + \Delta p_A V \Rightarrow \Delta p = \frac{p}{2}$

$1\text{-}A: Q > 0$; $A\text{-}2: Q < 0$; $2\text{-}1: Q = 0$

~~до т. А теплота + Q,~~

$p_A = \frac{p_1}{2} \Rightarrow \alpha = \frac{90^\circ - 30^\circ}{2} = 30^\circ$ (середина дуги 60°)



6) $\frac{A_y}{A_p} = \frac{2\Delta S}{S - \Delta S}$ (т.к. $A = S_{\text{гр.}}$)

$\frac{A_y}{A_p} = \frac{\Delta Q}{\Delta Q + \frac{3}{2}\nu R \Delta T} = \frac{Q_{12}}{Q_{12} + \frac{3}{2}\nu R \Delta T}$

Ответ: 1) $\frac{T_1}{T_2} = tg\,15^\circ \cdot tg\,30^\circ$

2) $\alpha = 30^\circ$

(2)

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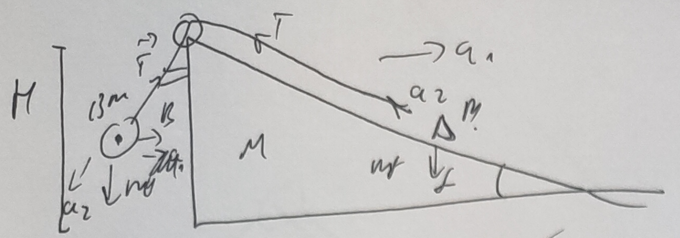
$\cos\beta = \frac{4}{5}$

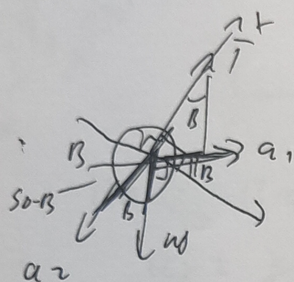
$\cos\alpha = \frac{12}{13}$



$13ma = T\sin\beta$

$T\cos\beta = 13mg$

$a = \frac{\sin\beta}{\cos\beta} g$!

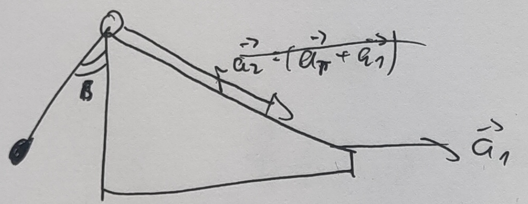


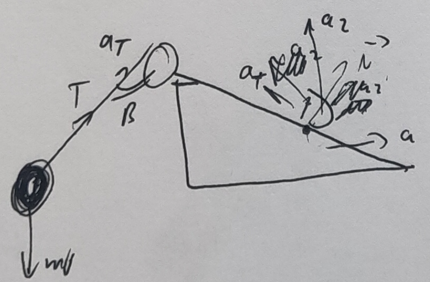
$13 m a_1 \cos\beta = 13 m g \sin\beta$

$a_1 = g \frac{\sin\beta}{\cos\beta}$ (1)

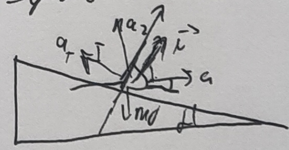
~~$a_1 \sin\beta =$~~

$13m(a_1 + a_2 \sin\beta) = T = 13m \sin\beta \left(\frac{g}{\cos\beta} + a_2\right)$





a_T – его отн.



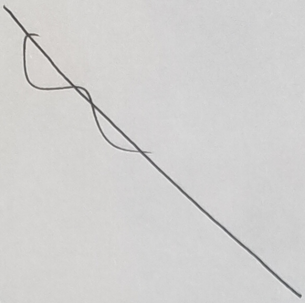
$N - mg\sin\alpha = ma\cos\alpha$

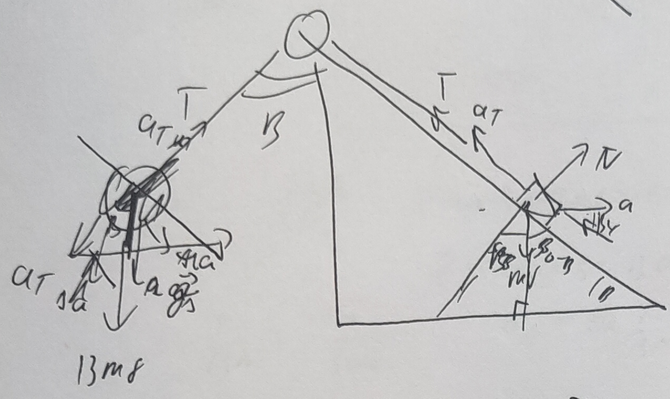
$N = m(g\sin\alpha + a\cos\alpha)$

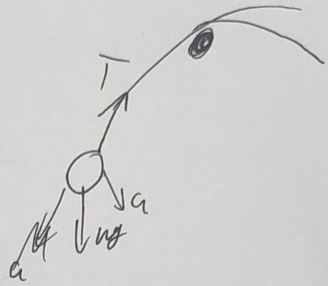
~~$N\sin\alpha = a - a_1\cos\alpha$~~

~~$m\frac{a}{\sin\alpha} - a_T m \frac{\cos\alpha}{\sin\alpha} = mg\sin\alpha + ma\cos\alpha$~~

~~$N\sin\alpha + T\cos\alpha =$~~







$13 m a_T = 13 mg \cos\beta - T$

$a_T = g\cos\beta - \frac{T}{13m}$ $\qquad \frac{T}{m} = (g\cos\beta - a_T)13$

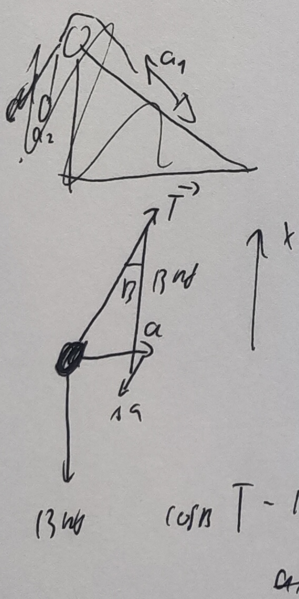
$T = mg\sin\beta = ma\cos\beta + a_T m$

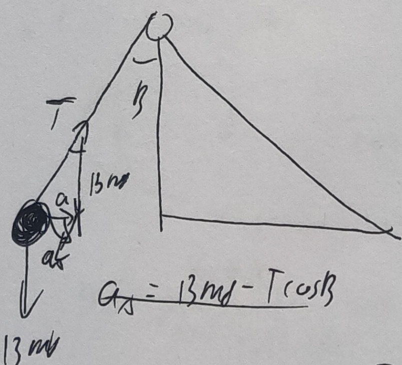
$\frac{T}{m} = g\sin\beta = a_T - a\cos\beta = g\cos\beta - \frac{T}{13m} - a\cos\beta$

$\frac{12}{13}\frac{T}{m} = g(\sin\beta + \cos\beta) - a\cos\beta$

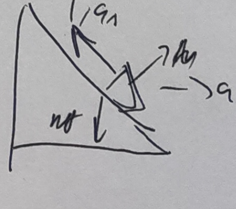
~~13mg~~

13mg





$a_1 = 13mg - T\cos\beta$



$13ma$

$\cos\beta\, T - 13mg = -13ma\cos\beta$

$a_1 = g - \frac{T}{13m}$

$a_1 = g - \frac{T}{13m}$

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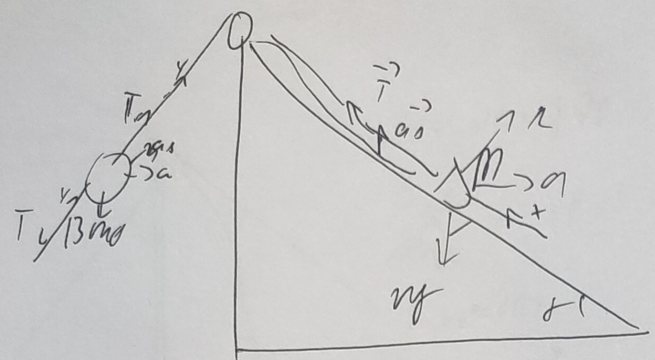

$$a = \frac{T \sin\beta}{13m} \qquad \cancel{T\cos\beta - 13mg = 13ma_{sy}}$$

$$T - 13mg\cos\beta = 13a_s m$$

$$\frac{T}{13m} = \frac{a}{\sin\beta} \qquad a_s = \frac{T}{13m} - g\cos\beta$$

$$T = \frac{13ma}{\sin\beta} \qquad a_s = \frac{a}{\sin\beta} - g\cos\beta$$

$$T - mg\sin\alpha = ma_s + ma\cos\alpha$$

$$\frac{13ma}{\sin\beta} - mg\sin\alpha = ma_s + ma\cos\alpha$$

$$\frac{13a}{\sin\beta} - g\sin\alpha = \frac{a}{\sin\beta} + a\cos\alpha$$

$$12a - g\sin\alpha\sin\beta = \cancel{a} + a\cos\alpha\sin\beta$$

$$a(12 - \cos\alpha\sin\alpha) = g\sin\alpha\sin\beta$$

$$a = g\frac{\sin\alpha\sin\beta}{12 - \cos\alpha\sin\alpha}$$

$$a_s = g\frac{\sin\beta}{12 - \cos\alpha\sin\beta} - g\cos\beta$$

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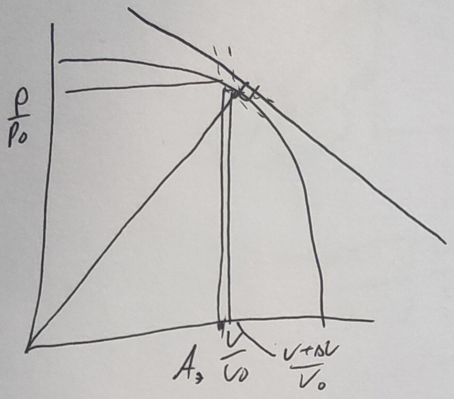
$C = \frac{Q}{\nu \Delta T} = 0 \qquad Q = \underset{>0}{A} + \underset{<0}{\Delta U}$

$\cancel{\Delta(PV)} =$



$A_3 = \Delta U_3 = \frac{3}{2}\nu R \Delta T = P\Delta V$

$\frac{P\Delta V}{\cancel{}} = \frac{3}{2}\nu R \Delta T$

$P = \frac{3}{2}\nu R \frac{\Delta T}{\Delta V}$

$P_1 V_1 = \nu R T_1$

$P = const \qquad \frac{\Delta T}{\Delta V} = const$

$P(V_1 + \Delta V) = (T_1 + \Delta)\nu R$

$P\cancel{V} = \Delta T \nu R$

$Q_3 = P\Delta V + \nu R \overset{\Delta T}{(T_2 - T_1)}$

$C_i = \frac{Q}{\nu \Delta T}$

$T = \frac{PV}{\nu R}$

$\left(\frac{P}{P_0}\right)^2 + \left(\frac{V}{V_0}\right)^2 = R^2$

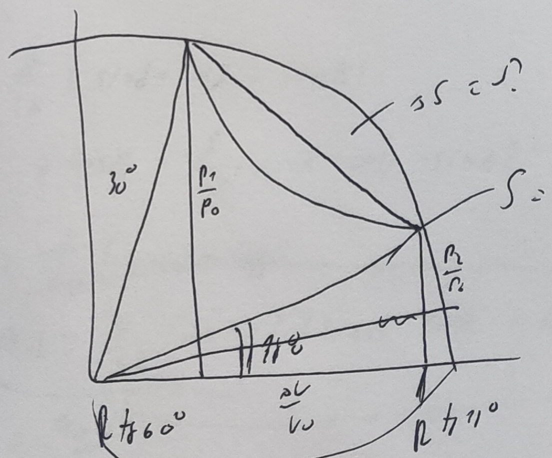
$P = R^2 P_0^2 V_0^2 - V^2 P_0^2$

$P^2 V_0^2 + V^2 P_0^2 = R^2 P_0^2 V_0^2$

$P^2 = P_0^2 (R^2 V_0^2 - V^2)$

$C_i = \frac{P\Delta V}{\nu \Delta T} + R \qquad P\Delta V = \nu R(T_1 - T_2)$

$\cancel{\nu \Delta T = \frac{PV}{R}}$



$\frac{A_\delta}{A_p} = \cancel{\frac{S - \Delta S}{S}} \quad \frac{2\Delta S}{S + \Delta S}$

$S = \left(\frac{R\,tg\,60° + R\,tg\,71°}{}\right)\left(\frac{R}{tg\,71°} - R\frac{R}{tg\,30°}\right)$

$S = R^2 (tg\,60° + tg\,71°)\left(\frac{tg\,30° - tg\,71°}{tg\,71° \cdot tg\,30°}\right)$

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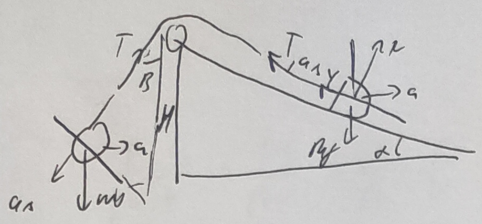


1

$a\cos B = g\sin B$

$$a = g\frac{\sin B}{\cos B}$$

$$a_s = g\cos B - \frac{T}{13m}$$

$$N\cos\alpha + T\sin\alpha = ma\sin\alpha$$

$$T - mg\sin\alpha = ma_s - a\cos B = ma_s \cdot g\sin B$$

$$T - mg\sin\alpha = mg\cos B - \frac{T}{13} - g\sin B$$

$$\frac{12}{13}\frac{T}{m} = g\sin\alpha + g\cos\alpha - g\sin B$$

$$\frac{T}{13m} = \frac{g}{12}(\sin\alpha + \cos\alpha - \sin B)$$

$$a_s = g\cos B - \frac{g}{12}(\sin\alpha + \cos\alpha - \sin B) =$$

$$\Rightarrow a_s = \frac{g}{12}\cancel{(-\sin\alpha + \cos\alpha}$$

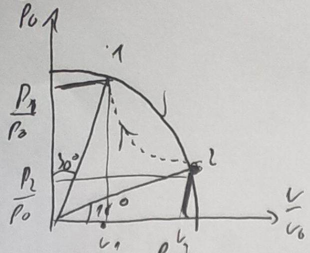
$$a_s = \frac{g}{12}(12\cos B + \sin B - \sin\alpha - \cos\alpha)$$

$$S = \frac{H}{\cos B} \quad \cancel{\text{rasm}} \quad S = \frac{a_s t^2}{2}$$

$$t = \sqrt{\frac{2S}{a_s}}$$

$$t = \sqrt{\frac{2H}{a_s \cdot \cos B}} = \sqrt{\frac{24H}{g\cos B(12\cos B + \sin B - \sin\alpha - \cos\alpha)}}$$

① $i=3$



$$tg\,15^\circ = \frac{\frac{p}{p_0}}{\frac{V}{V_0}} = \frac{p}{p_0}\frac{V_0}{V} = \frac{pV_0}{p_0V} = \frac{V_0}{p_0}\cdot\frac{p}{V} \approx 0{,}26$$

$\frac{V_0}{p_0} = a$

$$tg\,30^\circ = \frac{V}{V_0} : \frac{p}{p_0} = \frac{V}{V_0}\cdot\frac{p_0}{p} = \frac{p_0}{V_0}\cdot\frac{V}{p} = \frac{Vp_0}{pV_0} = \frac{1}{tg\,60^\circ}\quad \frac{1}{\sqrt{3}}$$

$x^2+y^2=R^2$

$\frac{x_a}{x_b}$ $x_a = R\,tg\,60^\circ$

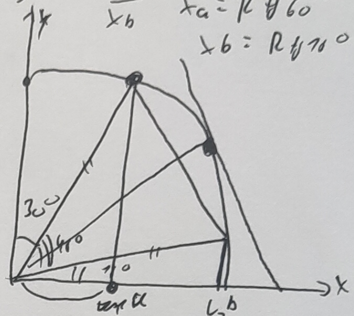
$x_b = R\,tg\,15^\circ$

2): $Q=0 \Rightarrow A = -\Delta U \Rightarrow \Delta(pV) = \frac{3}{2}\nu R(T_1-T_2)$

$\cancel{\frac{V_0}{p_0}}$

$tg\,15^\circ = a\frac{p}{V}$

$tg\,30^\circ = \frac{V}{p}\cdot\frac{1}{a}$ $\quad \frac{1}{tg\,60^\circ}$



$T_1 = \cancel{p_1V_1 \nu R}\ \frac{p_1V_1}{R\nu}$ $\quad T_2 = \frac{p_2V_2}{R\nu}$ $\quad \frac{T_1}{T_2}$

$$\frac{p^2}{p_0^2}+\frac{V^2}{V_0^2} = R^2 = \frac{V_1^2}{V_0^2}+\frac{p_1^2}{p_0^2} = \frac{V_2^2}{V_0^2}+\frac{p_2^2}{p_0^2}$$

$\cancel{tg\,30^\circ = \frac{V_1}{p_1}}$ $\quad \cancel{tg\,15^\circ = \frac{p_2}{V_2}}$

$\cancel{tg\,60^\circ = \frac{p_1}{V_1}}$

$$V_1^2p_0^2 + p_1^2V_0^2 = V_2^2p_0^2 + V_0^2p_2^2$$

$$p_0^2(V_1^2-V_2^2) = V_0^2(p_2^2-p_1^2)$$

$$tg\,15^\circ = \frac{p_2}{p_0} : \frac{V_2}{V_0} = \frac{V_0}{p_0}\cdot\frac{p_2}{V_2}$$

$$tg\,30^\circ = \frac{V_1}{V_0}\cdot\frac{p_0}{p_1} = \frac{p_0}{V_0}\cdot\frac{V_1}{p_1}$$

$$tg\,60^\circ = \frac{V_0}{p_0}\cdot\frac{p_1}{V_1}$$

$$tg\,30^\circ\cdot tg\,15^\circ = \frac{p_2}{V_2}\cdot\frac{V_1}{p_1} = \frac{p_2V_1}{V_2p_1} = \frac{p_2}{p_1}\cdot\frac{V_1}{V_2}$$

$$\frac{p_2}{p_1} = tg\,30^\circ\cdot tg\,15^\circ\cdot\frac{V_2}{V_1}$$

$p_2V_2 = \nu RT_2$

$p_1V_1 = \nu RT_1$

$\cancel{tg\,15^\circ = \frac{p_2V_0}{p_0V_2}}$

$$\frac{p_2}{p_1}\cdot\frac{V_2}{V_1} = tg\,30^\circ\cdot tg\,15^\circ\cdot\frac{V_2^2}{V_1^2} = \frac{T_2}{T_1}$$

$$\frac{\frac{V_1}{V_0}}{\frac{V_2}{V_0}} = \frac{V_1}{V_2} = \frac{R\cdot ctg\,60^\circ}{R\,ctg\,15^\circ} = \frac{1}{tg\,15^\circ\cdot tg\,30^\circ}$$

$$\left(\frac{V_2}{V_1}\right)^2 = \left(tg\,15^\circ\,tg\,30^\circ\right)^2$$

$$\frac{T_2}{T_1} = \frac{1}{tg\,30^\circ\cdot tg\,15^\circ}$$

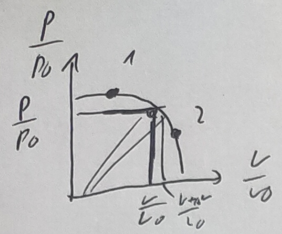
1

$$\frac{T_1}{T_2} = tg\,15^\circ\cdot tg\,30^\circ$$

21202150 (U801354 M1265951)

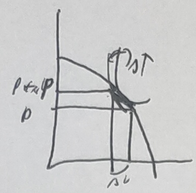
~~Чистовик~~ Черновик

1.



$pV=\nu RT$

$T_1=\frac{p_1V_1}{\nu R}$ $\quad T_2=\frac{p_2V_2}{\nu R}$



$tg\,75^\circ=\frac{V_0P_2}{P_0V_2}$

$C=\frac{Q}{\nu\Delta T}=\frac{P\Delta V+\nu R(T_2-T_1)}{\nu\Delta T}=0$

$tg\,60^\circ=\frac{V_0}{P_0}\frac{V_1}{V_1}$

$\frac{P\Delta V}{\nu\Delta T}=\frac{\nu R\Delta T}{\nu\Delta T}=R$

$P(V)=\frac{\nu RT}{V}$

$\frac{P\Delta V}{\nu\Delta T}=R=C_p$

$P\Delta V+\frac{\Delta P\Delta V}{2}=R\nu\Delta T=P\Delta V$

1) $\frac{T_1}{T_2}=tg\,75^\circ\,tg\,30^\circ$

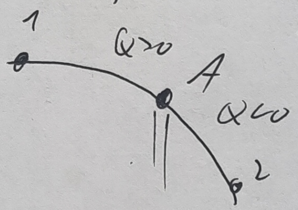
2) ~~$\frac{45^\circ}{2}+75^\circ=37{,}5^\circ$~~

$P=const$

$V\uparrow$

$pV=\nu RT$

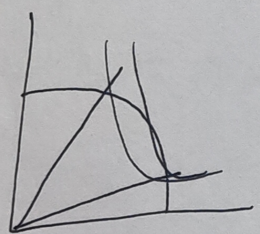
$T\uparrow\uparrow$ нам сорян



21: $Q=0$

$Q=A+\Delta U$

~~$A=\nu R\Delta T$~~



$C=\frac{P\Delta V+\frac{3}{2}\nu R\Delta T}{\nu\Delta T}=$

$\frac{3}{2}R=\frac{P\Delta V}{\nu\Delta T}=$

$\frac{3}{2}\nu R\Delta T=P\Delta V=\nu R\Delta T$

$\nu R\Delta T=\frac{P\Delta V}{2}$

$\frac{3}{2}P\Delta V=P\Delta V+\Delta P\Delta V$

$\frac{P}{2}=\Delta P$

Часть 2

Олимпиада: **Физика, 11 класс (2 часть)**

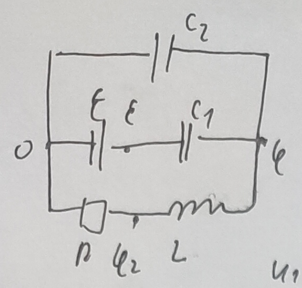
Шифр: **21202150**

ID профиля: **801354**

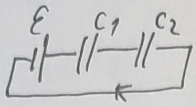
Вариант 5

Чистовик

3.



1) $t=0 \Rightarrow$ ток через L не идёт ($I_L=0$) $\Rightarrow$

$\Rightarrow$ 

$q_1=q_2=C_1U_1=C_2U_2$

$U_2=\frac{U_1}{2}$

$U_1+U_2=\mathcal{E} \Rightarrow U_2=\frac{\mathcal{E}}{3}$; $U_1=\frac{2}{3}\mathcal{E} \Rightarrow \varphi=\frac{1}{3}\mathcal{E}$

$$I'=\frac{U_L}{L}=\frac{\varphi-\varphi_2}{L}=\frac{1}{3}\cdot\frac{\mathcal{E}}{L}=\frac{\mathcal{E}}{3L}$$

$\varphi_2=0$ т.к. $I_L=0$

2) $A+W_1=Q+W_2$

$$W_1=\frac{C_1U_1^2}{2}+\frac{C_2U_2^2}{2}+\underbrace{\frac{LI_L^2}{2}}_{0}=\frac{1}{3}C\mathcal{E}^2$$

~~изза~~

3) $t=t_{уст} \Rightarrow$ ток через C_1 не течёт $\Rightarrow$ тока в цепи нет $\Rightarrow U_L=LI'=0$

$\Rightarrow \varphi=\mathcal{E} \Rightarrow U_1=\mathcal{E}$; $U_2=0$

$W_2=0+0+\frac{C_1U_1^2}{2}=\frac{C\mathcal{E}^2}{2}$ $\qquad q=C_1U_1=C\mathcal{E}$

4) $Q=A+W_1-W_2=\mathcal{E}\cdot q+W_1-W_2=C\mathcal{E}^2+\frac{1}{3}C\mathcal{E}^2-\frac{C\mathcal{E}^2}{2}=C\mathcal{E}^2\cdot\frac{5}{6}$

Ответ: 1) $I'=\frac{\mathcal{E}}{3L}$

2) $Q=C\mathcal{E}^2\cdot\frac{5}{6}$

Чистовик

5. 1) $D_0 + D_1 = \frac{1}{d} + \frac{1}{\infty} = \frac{1}{d}$

$D_0 + D_2 = \frac{1}{d} + \frac{1}{25\,см} \Rightarrow D_2 = D_1 + 4$ дптр

близорукий $\Rightarrow D_1, D_2 < 0$

1) $D_1 = 2D_2 \Rightarrow D_2 = -4$ дптр $\quad \underline{D_1 = -8 \text{ дптр}} \Rightarrow D_0 = \frac{1}{d} + 8$ дптр

$D_0 = \frac{1}{d} + \frac{1}{x} = \frac{1}{d} + 8$ дптр $\Rightarrow \underline{x = 12{,}5 \text{ см}}$

~~2) $D_2 = 2D_1 \Rightarrow D_2 = 8$ дптр $D_1 = 4$ дптр.~~

2) $D_0 + D_3 = \frac{1}{d} + \frac{1}{50\,см} = \frac{1}{d} + 2 = \frac{1}{d} + 8 + D_3 \Rightarrow D_3 = -6$ дптр

Ответ: 1) $x = 12{,}5$ см; $D_1 = -8$ дптр

2) -6 дптр.

~~Ответ:~~

Чистовик

4. $F_A = BdI'$ $\quad ma = F_A \Rightarrow \cancel{a = BdI'}$ $\quad a = \frac{Bd}{m} I'$

$I = \frac{\varepsilon}{r} = \frac{B \cdot S'}{r} = \frac{B v_0 d}{R : 6}$

$a = \frac{B^2 d^2 \cdot v_0 \cdot 6}{Rm}$

Ответ: 1) $a = \frac{6 B^2 d^2 \cdot v_0}{RM}$

3

$$a = \frac{B^2 d^2}{Rm}\left(1 - \frac{d}{h'}\right) \qquad v_{(t)} = \int a = \frac{B^2 d^2}{Rm}\left(1 - \ln(v_0 - 2at)\right)$$

$$h' = (V_0 t)' \qquad \int\left(\frac{-k}{h'}\right) \quad -k \ln(t)$$

$$V(t) = v_0 - at$$

$$h' = (v_0 t - at^2)' = (v_0 - 2at)$$

$$\cancel{V(t) = \frac{B^2 d^2}{Rm}\left(1 - \ln(v_0 - 2at)\right)}$$

$$a = \frac{B^2 d^2}{Rm}(h') = \frac{B^2 d^2}{Rm}(v_0 - 2at) \qquad \frac{B^2 d^2}{Rm} = k$$

$$h = v_0 t - \frac{at^2}{2}$$

$$a(t) = \frac{B^2 d^2}{Rm}\left(1 - \frac{d}{V(t)}\right)$$

$$h''$$

$$a = k - \frac{kd}{v}$$

$$v = \frac{-kd}{a+k} \qquad v(t) = -\frac{kd}{a(t)+k}$$

$$a(t) = v'(t) = +\frac{kd}{(a(t)+k)^2}\, a'(t)$$

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$D_0 = 12 = \frac{1}{d} + \frac{1}{\cancel{x}}$ $\frac{1}{x} = 8$

$\overset{\shortparallel}{4}$

$x = 12{,}5\ cm$

$D_0 + D = \cancel{D_4}\ \frac{1}{d} + \frac{1}{t} = 4 + 2 = 6$

$D_0 = 12 \quad D = -6$

$D_1 = 2D_2$

$D_2 = 2D_1$

$D_1 = 4$

$D_0 + 2D_2 = \frac{1}{d}$

$D_0 = \frac{1}{d} - 4$

$D_0 + D_2 = \frac{1}{d} + 4$

$2D_0 + 2D_2 = \frac{2}{d} + 8 \quad D_2 = -4$

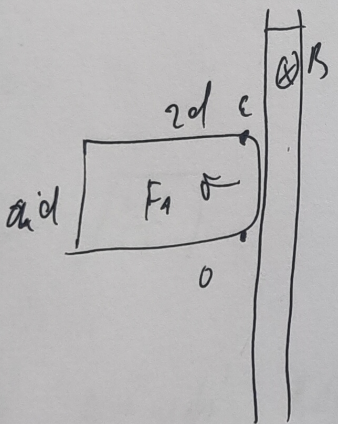
$\cancel{D_2 = -4}$

$D_1 = D_8$

$D_0 = \frac{1}{d} + 8$

$D_0 = \frac{1}{d} + \frac{1}{x}$

$D_0 = \frac{1}{d} - D_f$



$F_A = BIL = Bd \cdot I$?

$a = \frac{F_A}{m} = \frac{Bd}{m} \cdot I$

$\mathcal{E} = -(B \cdot S)'$

$\cancel{\mathcal{E} = -B \cdot S'}$

$\cancel{I_0 = \frac{\mathcal{E}}{R} \cdot t_0}$ $I_0 = \frac{\mathcal{E}}{R}$

$\cancel{\mathcal{E} = +B}$

$S = d \cdot h = d \cdot v_0 \cdot t \quad S' = d v_0$

$\mathcal{E} = B \cdot S' = B(d v_0 t)' = B d v_0$

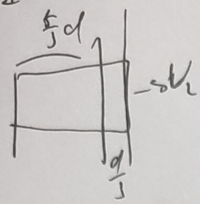
$I = \frac{\mathcal{E}}{R_i} = \frac{\mathcal{E}}{R} = \frac{B d v_0}{R}$

$a = \frac{B^2 d^2 \cdot v_0}{Rm}$

$F_A' = B d I' = \cancel{B d I'}$

$v =$

$I = \frac{Bd}{}$ $\quad v'(t) = a(t)$



$s = \frac{2d}{3}$ $\quad s' = \cancel{2 d v_m}$

$\cancel{s' = d t}$

$s = d v_m t$

$\cancel{\Delta x}$

$f(t) \cdot t$

$\shortparallel$

$t f'(t) + f(t) \qquad a t + v(t)$

$\cancel{s = dL} \qquad \cancel{s = d v' \cdot t + v(t)}$
a

$s = d \cdot v(t) \cdot t$

$a(t) \quad a = \frac{Bd}{m} \cdot \frac{B s'}{R} = \frac{B^2 d}{mR} \cdot s' = \frac{B^2 d^2}{mR} \cdot (v(t) t)' = \frac{B^2 d^2}{mR} \left(\cancel{a t + v_0 - at} \right)$

$v(t) = v_0 - at$

$((v_0 - at) t)' = (v_0 t - a t^2)' = v_0 - 2at$

$\frac{h}{3} = \frac{a t^2}{2}$

$\sqrt{\frac{2}{3} \frac{h}{a}} = t$

$a = k\left(v_0 - 2\sqrt{\frac{2ha}{3}} \right)$

$a = \frac{B^2 d^2}{mR} (v_0 - 2at)$

k

$a = k v_0 - 2akt$

$a(1 + 2ak) = k v_0$

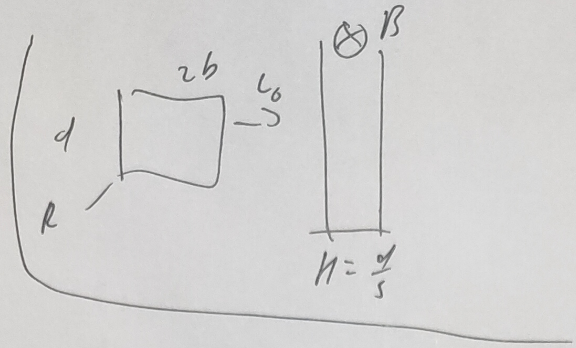
$2a^2 k t + a - k v_0 = 0$

$D = 1 + 8 \cdot k^2 t$

$a = \frac{-1 \mp \sqrt{1 + 8k^2 t}}{2}$

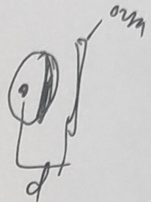
$I = \frac{B \cdot d \cdot h'}{R \cdot (d + h')} = \frac{Bd}{R} \cdot \frac{h'}{d + h'} = \frac{Bd}{R} \left(1 - \frac{d}{h'} \right)$

$D_0^{<0}$



$\frac{D_1}{D_2}$

$D_{10} = D_1 + D_0 =$



$D_0 = \frac{1}{F_0} =$

$D_\infty = \frac{1}{F_\infty} = \frac{1}{\infty} + \frac{1}{d} = \frac{1}{d}$ $\quad \frac{1}{d} = D_\infty = D_1$

$D_2 = \frac{1}{F_\delta} = \frac{1}{d} + \frac{1}{25\,см} = \frac{1}{D_1} + \frac{1}{25}$

$\frac{D_1}{D_2} = 2$ $\quad D_1 = 2D_2$ $\quad \frac{D_2}{2} = \frac{1}{25}$

$D_2 = \frac{2}{25}$ дптр.

$d = D_1 = 2D_2$

$D_2 = \frac{1}{d} + \frac{1}{25} = D_1 + \frac{1}{25}$

$D_2 = 2D_1$ $\quad D_1 = \frac{1}{25} = \frac{1}{d}$ $\quad d = 25$ см $-$ без очков

$D_1 = \frac{1}{25\,см} = 4$ дптр.

$D_2 = 8$ дпт

~~$D_{гл} + D_{очк} = D_0 + D_1 =$~~

$D_0 + D_1 = \frac{1}{d}$

$\boxed{D_1 = 4 \text{ дптр.}}$

$D_0 + D_2 = \frac{1}{d} + \frac{1}{25\,см}$ $\quad \frac{1}{25\,см} = \frac{1}{d}$ $\quad d = 25$ см $\quad \frac{1}{D_0}$ $\quad D_0 + \frac{1}{d} + \frac{1}{25}$

$D_2 = 2D_1$ $\quad D_0 = 0$

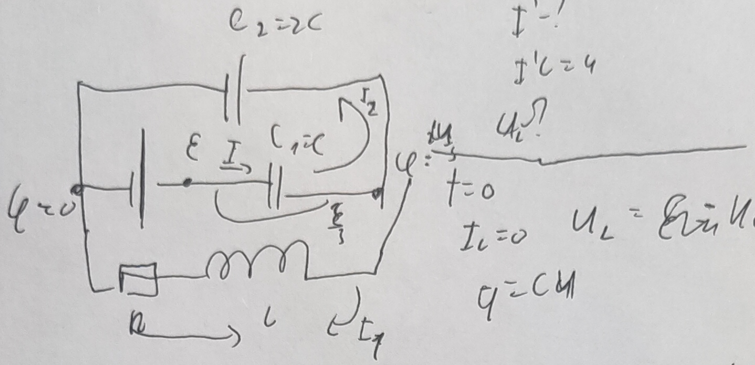
$D_2 = D_1 + 4$

$D_0 = \frac{1}{d} - D_1 = 4 + 8 = 12$ дптр

$D_1 = -8 \quad D_2 = -4$

$\frac{D_1}{D_2} = 2$ 	$\frac{1}{F} \sim \frac{1}{d_1}$ 	$d \sim F_1$ 	$\frac{1}{2F} + \frac{1}{d_2} = \frac{1}{F_1}$

$$\frac{\frac{1}{d_1}}{\frac{1}{2F} +}$$



$I' - ?$

$I'_L = 4$

U_L ?

$t = 0$

$I_L = 0$ 	$U_L = \mathcal{E} - U_{C_1}$

$q = CU$

1) $I' = \frac{\mathcal{E}}{3L}$

2) $Q = C\mathcal{E}^2$

$q_1 = q_2 = CU_1 = 2CU_2$ 	$U_2 = \frac{U_1}{2} = \frac{\mathcal{E}}{3}$

$U_1 + U_2 = \mathcal{E}$ 	$U_1 = \mathcal{E} \cdot \frac{2}{3}$

$U_C = \frac{1}{3}\mathcal{E}$

1) $I' = \frac{U_L}{L} = \frac{\mathcal{E}}{3L}$

2) $I = I_2 + I_2 = \frac{q}{t} = \frac{q_L}{t} + \frac{q_2}{t}$

$q_2 = 2C \cdot U_2$

$$W_1 = \frac{C_1 \cdot U_1^2}{2} + \frac{C_2 \cdot U_2^2}{2} + \cancel{\frac{LI_L^2}{2}} = \frac{C}{2}\left(\frac{2}{3}\mathcal{E}\right)^2 + C \cdot \left(\frac{1}{3}\mathcal{E}\right)^2 = \frac{1}{3}C\mathcal{E}^2 = W_1$$

$W_2 = 0$

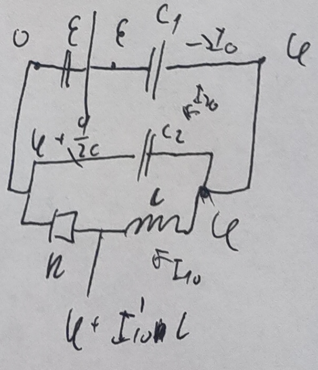
$q = C_1U_1 = C_1\frac{2\mathcal{E}}{3} = \frac{2}{3}C\mathcal{E}$

$W_1 + A = Q + 0$

$q = CU$ 	$U = \frac{q}{C}$

$Q = A + W_1 - 0 = \frac{2}{3}C\mathcal{E}^2 + q\mathcal{E} = C\mathcal{E}^2$

$I = I_0 = I_{10} + I_{20}$



$6 + 2 - 3 =$

$\frac{2}{4} + \frac{1}{5}$

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