Часть 1

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

Шифр: **21202318**

ID профиля: **372996**

Вариант 3

№2

1) $Q_1 = -\delta Q(T) = -\nu \cdot c(T) \cdot \Delta T =$ $i = 3$

$= -3\nu R \frac{T\Delta T}{T_0}$ (*) ΔT - изменение температуры от T_0 до T.

Суммируем (*):

$$-\sum \delta Q = Q_1 = -\frac{3\nu R}{T_0}\sum T\Delta T = -\frac{3\nu R}{T_0}\left(\frac{T_{конеч}^2}{2} - \frac{T_{начал}^2}{2}\right) =$$

$$= \frac{3\nu R}{2T_0}\left(T_0^2 - \frac{9}{25}T_0^2\right) = \frac{3}{2}\cdot\frac{16}{25}\nu R T_0 = \frac{48}{50}\nu R T_0 = 0{,}96\,\nu R T_0$$

2) $Q = \Delta U + A$

$A = Q - \Delta U$

$$A = A(T) = 3\nu R\frac{T\Delta T}{T_0} - \frac{3}{2}\nu R\Delta T = 3\nu R(T_0 - T)\left(\frac{T}{T_0} - \frac{1}{2}\right) = \frac{3\nu R}{T_0}\left(-2T^2 + 3T_0T - T_0^2\right)$$

$\Delta T = T_0 - T$

3) $A_{min} = A(T_{min}) = A\left(\frac{3T_0}{4}\right) =$

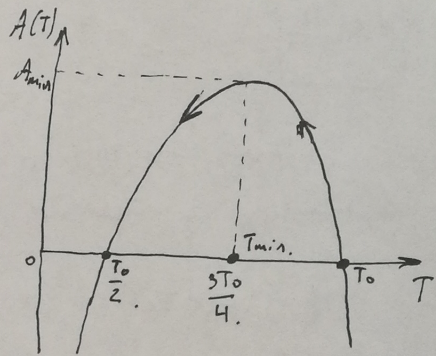
$= \frac{3\nu R}{T_0}\left(-2\cdot\frac{9}{16}T_0^2 + 3\cdot\frac{3T_0^2}{4} - T_0^2\right) =$

$= \frac{3\nu R}{T_0}\left(-\frac{9}{8}T_0^2 + \frac{9}{4}T_0^2 - T_0^2\right) =$

$= 3\nu R T_0\left(\frac{9}{4} - \frac{9}{8} - 1\right) =$

$= 3\nu R T_0\left(\frac{9}{8} - 1\right) = 3\nu R T_0\left(\frac{1}{8}\right) =$

$= \frac{3}{8}\nu R T_0$



В силу симметрии

$T_{min} = \frac{T_0 + \frac{T_0}{2}}{2} = \frac{3T_0}{4}$.

Ответ: ① $0{,}96\,\nu R T_0$; ② $\frac{3T_0}{4}$; ③ $\frac{3}{8}\nu R T_0$.

черновик.

$-\cancel{Q_1 =}$

$Q = \Delta U + A$

$A = Q - \Delta U.$

$A = 3\nu R \frac{T\Delta T}{T_0} - \frac{3}{2}\nu R \Delta T =$

$= 3\nu R\left(\frac{T\Delta T}{T_0} - \frac{\Delta T}{2}\right) > 0$

$\frac{T\Delta T}{T_0} - \frac{\Delta T}{2} > 0.$

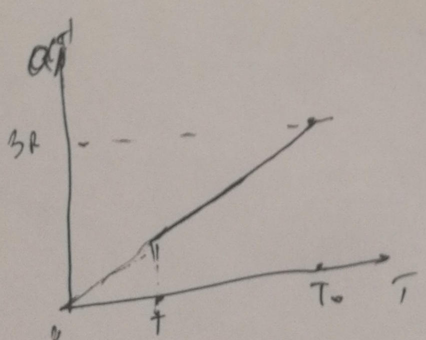
$\frac{T}{T_0} - \frac{1}{2} < 0$

$\frac{T}{T_0} < \frac{1}{2}$

$T \le \frac{T_0}{2}.$

$A_r = 3\nu R$

$A(T)$



$A_{min} = 3\nu R\left(\frac{\frac{T_0}{2}\cdot\left(\frac{T_0}{2} - T_0\right)}{T_0} - \frac{T_0 - \frac{T_0}{2}}{2}\right) =$

$= 3\nu R\left(\frac{T_0}{2} - T_0\right)\cdot\left(\frac{\frac{T_0}{2}}{T_0} - \frac{1}{2}\right) =$

$= 3\nu R\cdot -\frac{1}{2}T_0\cdot\left(\frac{1}{2} - \frac{1}{2}\right) = 0.$

$A = 3\nu R\Delta T\left(\frac{T}{T_0} - \frac{1}{2}\right) =$

$\cancel{A} =$

$A = 3\nu R(T_0 - T)\left(\frac{T}{T_0} - \frac{1}{2}\right) \ge 0.$

$T_0 - T\left(\frac{T}{T_0} - \frac{1}{2}\right) \ge 0.$

$\frac{T\cdot T_0}{T_0} - \frac{T^2}{T_0} - \frac{T_0}{2} + \frac{T}{2} \ge 0.$

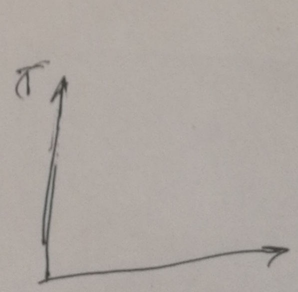
$T - \frac{T^2}{T_0} - \frac{T_0}{2} + \frac{T}{2} \ge 0$

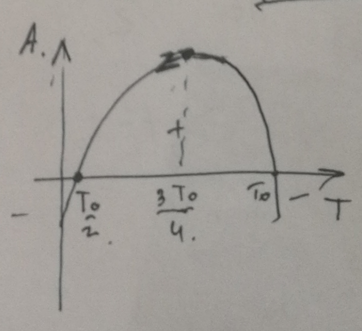
$-\frac{T^2}{T_0} + \frac{3T}{2} - \frac{T_0}{2} \ge 0.$

$-2T^2 + 3T_0T - T_0^2 \ge 0.$

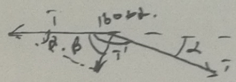
$D = 9T_0^2 - 8T_0^2 = T_0$

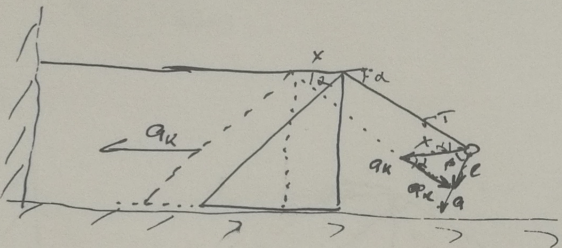
$T_{1,2} = \frac{-3T_0 \pm T_0}{-4} = \boxed{T_0 \text{ н.и.}, \ \frac{T_0}{2}.}$

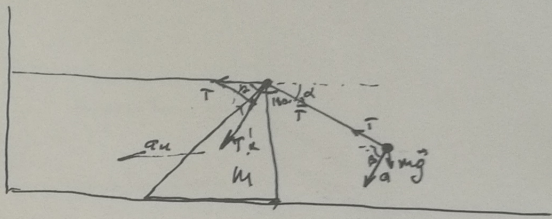




Черновик.







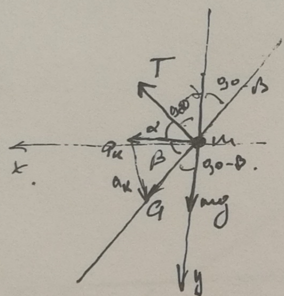
$a = a_к \cdot \sqrt{2(1-\cos\alpha)} = \frac{4}{\sqrt{15}} a_к.$

$T_к = \frac{4}{\sqrt{15}} T.$ $T_x = T_к \cdot \cos\beta.$

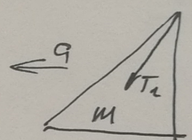
$T - T \cdot \cos\alpha.$

$Ma_к =$ $T_x = T(1-\cos\alpha). =$

1)



2)



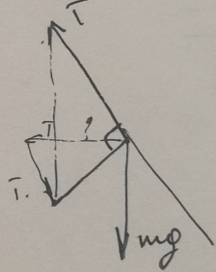
$ma = mg \cdot \sin\beta - T \cdot \cos(180 - (\alpha+\beta))$

$Ma_к = T_x$

$a_к = \frac{T_x}{M}.$

$a = g\sin\beta - T\cos(180 - (\alpha+\beta)).$

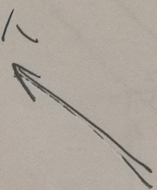
$mg(H - l \cdot \cos\beta).$



56,3

67,4

T



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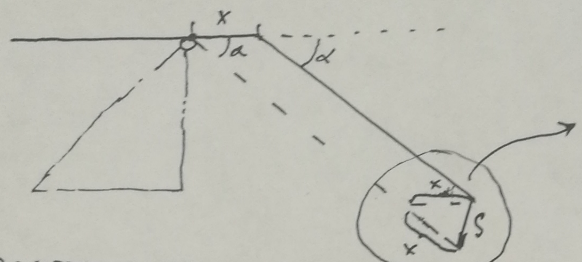
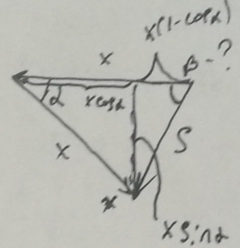
(N1) Чистовик Физика В11-03 Страница 2.

$\cos\alpha = \frac{5}{13} \Rightarrow \sin\alpha = \frac{12}{13}$

Рассмотрим нить:

~~Х-часть нити, которая~~





X- расстояние, на которое ~~время~~ переместился клин за время τ

$$tg\beta = \frac{x\sin\alpha}{x(1-\cos\alpha)} = \frac{\sin\alpha}{1-\cos\alpha} =$$

$$\cancel{= \frac{\frac{5}{13}}{1-\frac{12}{13}} = \frac{5}{13}} =$$

$$= \frac{\frac{12}{13}}{1-\frac{5}{13}} = \frac{12}{13-5} = \frac{12}{8} = \frac{3}{2}$$

$$\underline{tg\beta = \frac{3}{2}}$$

Т.к. ц

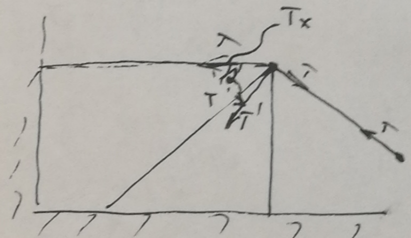
(Это зачёркнуто случайно

2). S - перемещение шарика за время τ

$$S = \sqrt{2x^2 - 2x^2\cos\beta\alpha} =$$

$$= x\sqrt{2(1-\cos\alpha)} =$$

$$= \boxed{x\frac{4}{\sqrt{15}}}$$



$$T_x = T(1-\cos\alpha) = \cancel{T\frac{4}{\sqrt{15}}}$$

Дифференцируя полученное выражение 2 раза получаем, что

$$a_ш = \frac{4}{\sqrt{15}} a_к$$

$a_ш$ - ускорение шарика

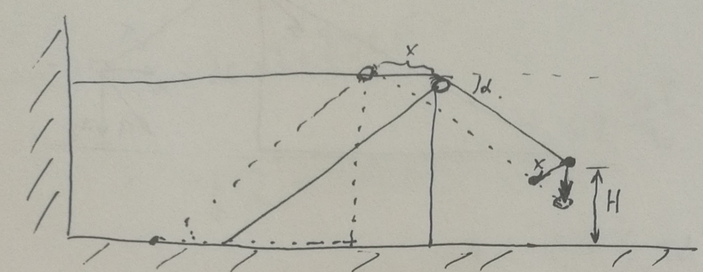
$a_к$ - ускорение клина.

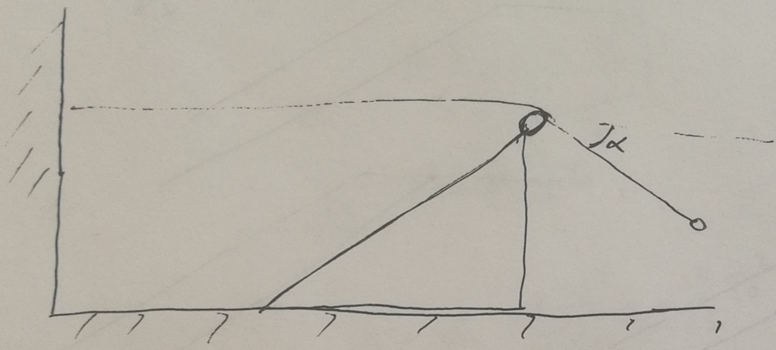
Ускорение шарика направленно перпендикулярно $\vec{T}$

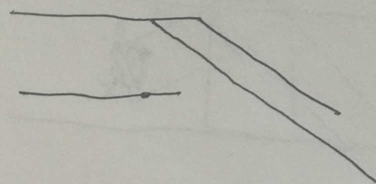
(

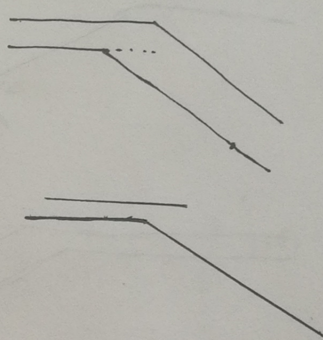
Черновик.

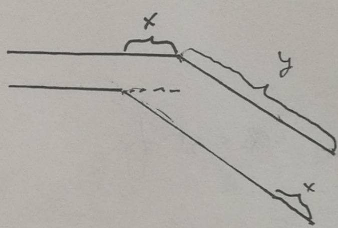
№1.

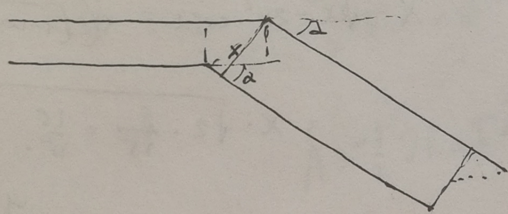


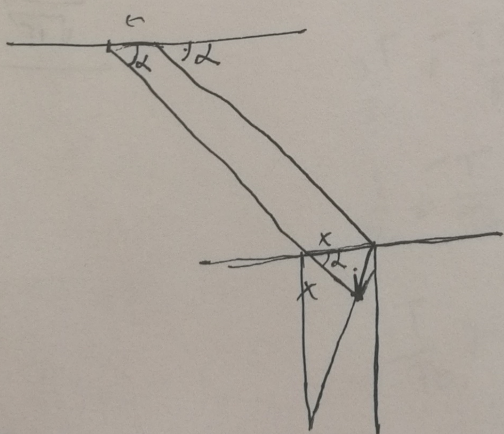




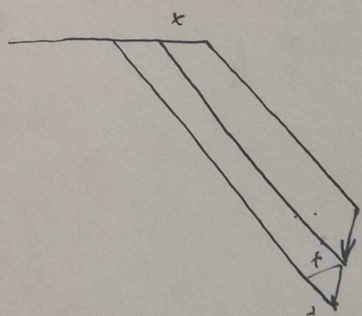








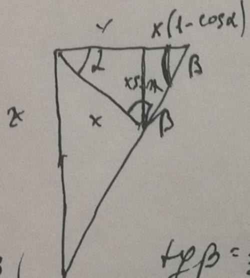
$\frac{13}{x \cdot 13} = 12.$



$\frac{12}{13}$

$\cancel{\cos\beta =}$

$$\boxed{tg\,\beta = \frac{x\sin\alpha}{x(1-\cos\alpha)} = \frac{\sin\alpha}{1-\cos\alpha}.}$$



$$\beta = \frac{180-\alpha}{2} = 90 - \frac{\alpha}{2}.$$

$$\frac{\frac{12}{13}}{1-\frac{5}{13}} = \frac{\frac{12}{13}}{\frac{8}{13}} = \frac{12}{8} = \frac{6}{4} = \frac{3}{2}$$

$$\boxed{tg\,\beta = \frac{3}{2}.}$$

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$\overline{T_0^2})$

№2 черновик.

$i=3$, ν

T_0

$-Q_1 = \Delta U_1 + A_1$

$-\nu c \Delta T = \frac{3}{2}\nu R \Delta T +$

$\delta Q_1 = -\nu c \Delta T = -\nu \cdot 3R \frac{T\Delta T}{T_0}$

$\sum \delta Q_1 = -\frac{3\nu R}{T_0} \sum T\Delta T$

$$Q_1 = -\frac{3\nu R}{T_0}\left(\frac{\frac{9}{25}T_0^2 - T_0^2}{2}\right)$$

$$Q_1 = 3\nu R \frac{16}{25} T_0$$

$$Q_1 = -\frac{3\nu R}{2T_0} \cdot -\frac{16}{25}T_0^2 = \frac{3}{2}\cdot\frac{16}{25}\cdot \nu R T_0 = \frac{48}{50}\nu R T_0 = 0{,}96\,\nu R T_0.$$

$+Q_1 = \Delta U + A$

$$A = -\frac{3}{2}\nu R \Delta T + 3\nu R \frac{T\Delta T}{T_0} = 3\nu R\left(\frac{\Delta T}{2} + \frac{T\Delta T}{T_0}\right) > 0.$$

$\frac{\Delta T}{2} + \frac{T\Delta T}{T_0} > 0.$ $\quad A = \frac{3}{2}\nu R\,\cancel{\left(\frac{\frac{T_0}{2} - \frac{T_0}{2}}{T_0 - \frac{T_0}{2}}\right)}$

$\frac{1}{2} + \frac{T}{T_0} > 0$ $\quad A = \frac{3}{2}\nu R\, \frac{T_0}{2} - T_0 -$

$\frac{T}{T_0} > +\frac{1}{2}.$

$T \geqslant +\frac{1}{2}T_0.$

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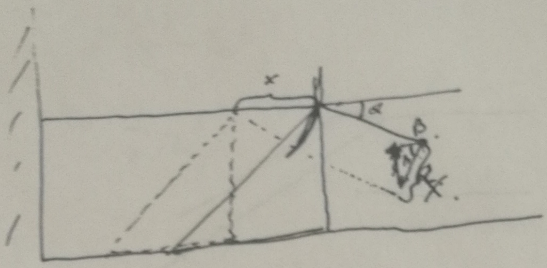
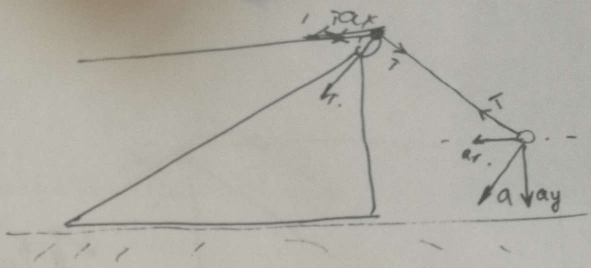
$3ЭR\left(-2T^2+3T_0T-T_0^2\right) = A_T(T).$

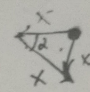
черновик

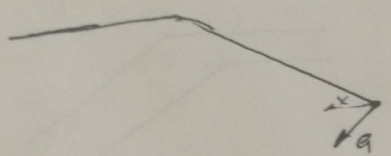
$3ЭR\left(-2\cdot\frac{9T_0^2}{16}+\frac{9}{\ldots}-3\ldots\right)$

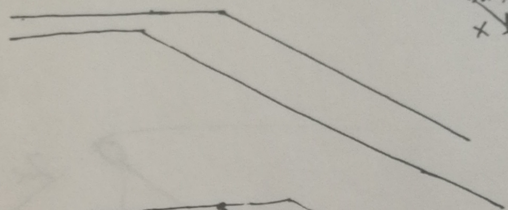
черновик

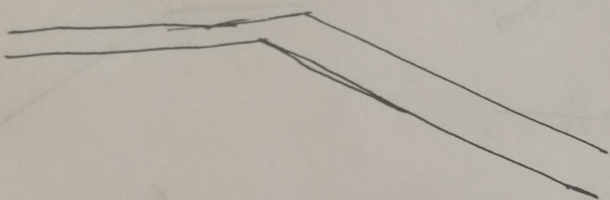


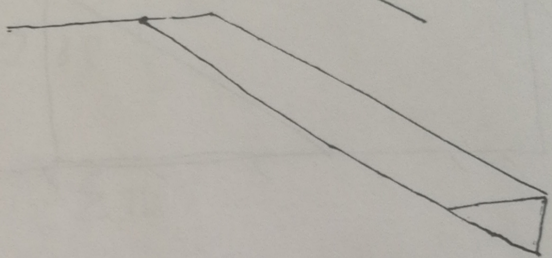












$a_x = a\cdot tg.$

$$x' = \sqrt{2x^2-2x^2\cdot\cos\alpha} = x\sqrt{2(1-\cos\alpha)} =$$

$$= x\cdot\sqrt{2\cdot\frac{8}{15}} = \frac{16}{15}.$$

$$\boxed{\frac{4}{\sqrt{15}}x.}$$

В

$$3\nu R\left(-2T^2+3T_0T-T_0^2\right)=A_r(T).$$ Черновик

$$3\nu R\left(-2\cdot\frac{9T_0^2}{16}+\frac{9}{4}T_0^{2}-T_0^2\right)=A_r$$

$$3\nu R\left(\frac{9}{4}T_0^2-\frac{9}{8}T_0^2-T_0^2\right)=A_r.$$

$$3\nu R\left(\frac{18}{8}T_0-T_0\ \frac{1}{8}T_0^2\right)$$

$$\frac{T(T_0-T)}{T_0}=\frac{T_0-T}{2}\Big)=$$

$$=T-\frac{T^2}{T_0}-\frac{T_0}{2}-\frac{T}{2}.$$

Часть 2

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

Шифр: **21202318**

ID профиля: **372996**

Вариант 3

Чистовик Физика В 11-03. Страница 1.

№3

сразу после замыкания ключа; $U_1(t_3)=U_1(0)$, $U_2(t_3)=U_2(0)$, t_3 – момент сразу после замыкания ключа.

1)

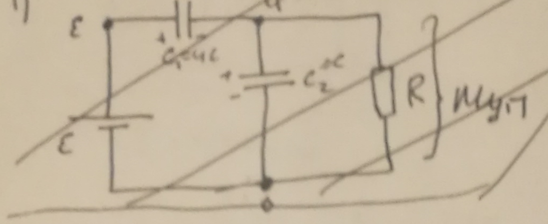
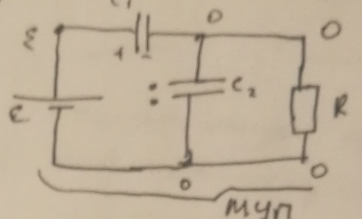
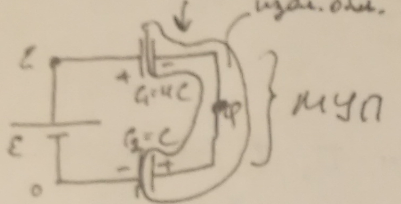


Схема в установившемся состоянии 2 (после замык. ключа):



$I_1(\tau)=0$, $I_2(\tau)=0$; токи через C_1 и C_2 в установившемся режиме 2 (τ).

При разомкнутом ключе:



$U_1(\tau)=\varepsilon$ $\quad W(\tau)=\frac{4C\varepsilon^2}{2}=2C\varepsilon^2$

$U_2(\tau)=0$

Т.к конденсаторы в начале были не заряжены, а сейчас схема находится в установившемся состоянии, то

ЗСЗ для изолированной области:

$$-4C(\varepsilon-\varphi)+C(\varphi-0)=0$$

$$-4\varepsilon+4\varphi+\varphi=0$$

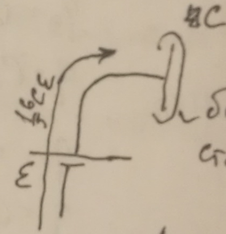
$$5\varphi=4\varepsilon$$

$$\boxed{\varphi=\frac{4\varepsilon}{5}}$$, тогда

$U_1(0)=\varepsilon-\varphi=\frac{\varepsilon}{5}$

$U_2(0)=\varphi-0=\frac{4\varepsilon}{5}$ – напряжения на C_1 и C_2 в уст. состоянии 1

Энергия в начале $W(0)=\frac{4C\cdot\frac{\varepsilon^2}{25}}{2}+\frac{C\cdot\frac{16\varepsilon^2}{25}}{2}=\frac{10}{25}C\varepsilon^2=\frac{2}{5}C\varepsilon^2$.



было $q_1(0)=\frac{4\varepsilon C}{5}$

стало $q_2(\tau)=4\varepsilon C$

$$A_б=\varepsilon\cdot\frac{16}{5}C\varepsilon=\frac{16}{5}C\varepsilon^2$$

$$A_б=\Delta W+Q \Rightarrow$$

$$\Rightarrow Q=A_б-\Delta W=A_б+W(0)-W(\tau)$$

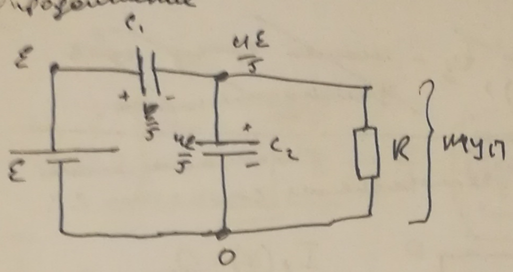
$\Delta W=W(\tau)-W(0)$

$$Q=\frac{16}{5}C\varepsilon^2+\frac{2}{5}C\varepsilon^2-2C\varepsilon^2$$

$$Q=\frac{18}{5}C\varepsilon^2-2C\varepsilon^2=\frac{8}{5}C\varepsilon^2$$

Чистовик Физика Страница 2 В 11-03.

Сразу после замыкания ключа:
размыкание



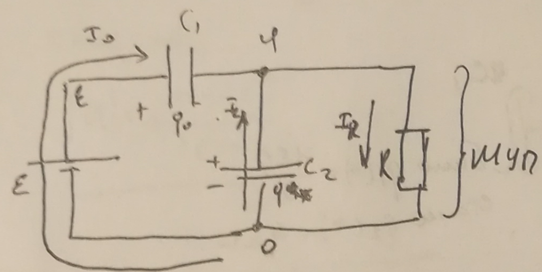
$U_1(t_3) = U_1(0)$; t_3 — момент сразу после замыкания ключа

$U_2(t_3) = U_2(0)$,

$$U_R(t_3) = \frac{4\varepsilon}{5}$$

$$I_R = \frac{U_R(t_3)}{R} = \frac{4\varepsilon}{5R}$$

Рассмотрим цепь в момент T, $I_1(T) = I_0$.



$$q_0 = C_1 \cdot U_1$$

$$q = C_2 \cdot U_2$$

$$q_0 = 4C \cdot (\varepsilon - \varphi) \Rightarrow q_0 = 4C\varepsilon - 4q \quad (*)$$

$$q = C(\varphi - 0)$$

$$\varphi = \frac{q}{C}$$

Дифференцируем (*) по времени:

$$q_0' = (4C\varepsilon)' - 4q'$$

$$I_0 = 4I_2 \qquad q' = -I_2$$

$$I_2 = \frac{I_0}{4} \qquad q_0' = I_0$$

$$(4C\varepsilon)' = 0$$

$$\text{ЗСЗ: } I_0 + I_2 = I_R = \frac{5I_0}{4}$$

$$U_R(T) = \frac{5I_0}{4} \cdot R = \frac{5}{4} I_0 R$$

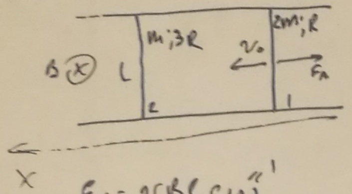
Ответ: $\frac{4\varepsilon}{5R}$; $\frac{8}{5}C\varepsilon^2$; $\frac{5}{4}I_0 R$.

Чистовик Страница 3 Физика В 11-03.

VII.

$l = L$

(+)



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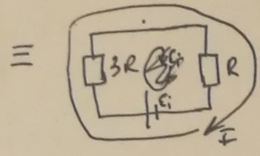


$\mathcal{E}_i = vBl\sin\alpha$

$I = \frac{\mathcal{E}_i}{R+3R} = \frac{\mathcal{E}_i}{4R} = \frac{vBl}{4R}$

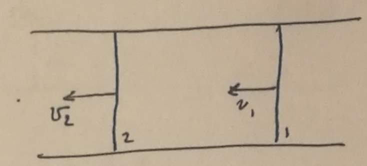
$F_A = IBl\sin\alpha = \frac{vB^2l^2}{4R}$

2ЗН:

$2ma_x = -F_A$

$|a| = +\frac{vB^2l^2}{8Rm}$

Через продолжительное время:



Скорость каждой перемычки через продолжительный промежуток времени const $\Rightarrow a(t) = 0$.

$\Rightarrow F_A(t) = 0 \Rightarrow I(t) = 0 \Rightarrow \mathcal{E}_{i2} = \mathcal{E}_{i1} \Rightarrow v_1 = v_2 = v$

$\mathcal{E}_i = vBl$

Рассматривая перемычки в системе можно использовать ЗСИ:

$2mv_0 = mv + 2mv \Rightarrow v = \frac{2v_0}{3}$

ЗСЭ для всей системы: $\frac{2mv_0^2}{2} = \frac{3mv^2}{2} + Q$; Q – выделившаяся теплота на резисторах.

$mv_0^2 - \frac{3}{2}m\cdot\frac{4}{9}v_0^2 = Q$

$Q = \frac{1}{3}mv_0^2$.

$\delta Q = \frac{U^2(v)}{4R}\cdot\Delta t = \frac{B^2l^2}{4R}\cdot v_{отн}^2\Delta t = \frac{B^2l^2}{4R}\cdot v_{отн}\cdot\Delta x$ (*)

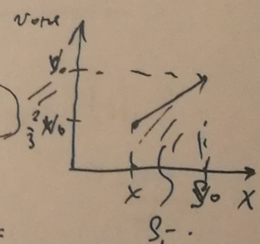
$U(v) = \mathcal{E}_{i1}(v) - \mathcal{E}_{i2}(w) =$

$\mathcal{E}_i = vBl$

$= Bl(v_1 - v_2) = Bl\cdot v_{отн}$.

просуммируем (*)

$\Sigma\delta Q = Q = \frac{B^2l^2}{4R}\cdot\{\Sigma v_{отн}\cdot\Delta x\}$



$\frac{1}{3}mv_0^2 = \frac{B^2l^2}{4R}\cdot\frac{1}{2}\left(v_0 + \frac{2}{3}v_0\right)(S_0 - x) =$

$= \frac{B^2l^2}{4R}\cdot\frac{5}{6}v_0\cdot(S_0 - x)$

$\frac{1}{3}mv_0 = \frac{5B^2l^2}{24R}\cdot v_0\cdot(S_0 - x)$

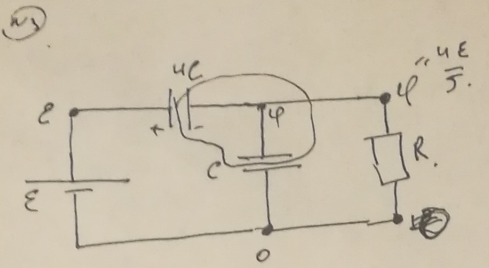
$\frac{24}{5}\cdot\frac{1}{3}\frac{mv_0R}{B^2l^2} = S_0 - x$

$x = S_0 - \frac{8}{5}\frac{mv_0R}{B^2l^2}$.

Ответ: $\frac{vB^2l^2}{8R}$, $\frac{2v_0}{3}$, $S_0 - \frac{8}{5}\frac{mv_0R}{B^2l^2}$, $S_0 - \frac{8}{5}\frac{mv_0R}{B^2l^2}$

Черновик:

№3

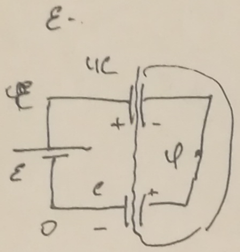


$U_{4C}(0) = \frac{\varepsilon}{5}$

$U_C(0) = \frac{4\varepsilon}{5}$

$I_R(0) = \frac{4\varepsilon}{5R}$

$A_б = \Delta W + Q$



ЗСЗ:

$-4C(\varepsilon-\varphi)+C(\varphi-0)=0$

$4\varepsilon-4\varphi=\varphi$

$5\varphi=4\varepsilon$

$\varphi=\frac{4\varepsilon}{5}$

$W(0) = \frac{4C\cdot\frac{\varepsilon^2}{25}}{2} + \frac{C\cdot\frac{16\varepsilon^2}{25}}{2} =$

$= \frac{2\varepsilon^2}{25} + \frac{8\varepsilon^2}{25} = \frac{10\varepsilon^2}{25} = \frac{2}{5}C\varepsilon^2$

$-4C(\varepsilon-\varphi)+C(\varphi-0)=0$

$4(\varepsilon-\varphi)=\varphi$

$4\varepsilon-4\varphi=\varphi$

$\varphi=\frac{4\varepsilon}{5}$

$\frac{16}{5}C\varepsilon^2 = 2C\varepsilon^2 - \frac{2}{5}C\varepsilon^2 + Q$

$\frac{16}{5}C\varepsilon^2 - 2C\varepsilon^2 + \frac{2}{5}C\varepsilon^2 = Q$

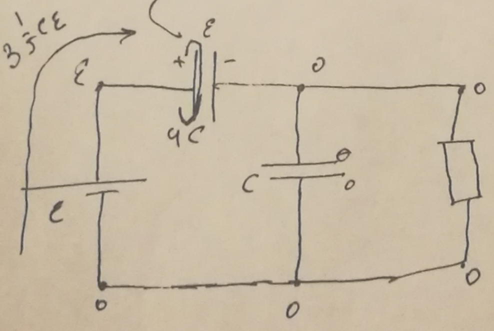
$\frac{18}{5}C\varepsilon^2 - 2C\varepsilon^2 = Q$

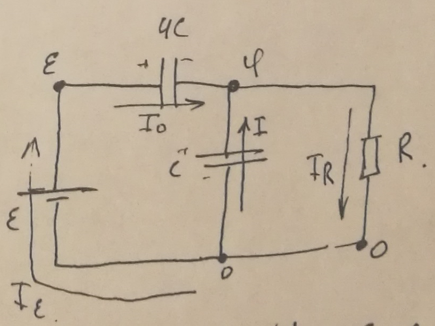
$Q = \frac{8}{5}C\varepsilon^2$

было $+4C\cdot\frac{\varepsilon}{5} = \frac{4}{5}C\varepsilon$

стало: $4C\varepsilon$

$3\frac{1}{5}C\varepsilon$





$A_б = \frac{16}{5}C\varepsilon^2$

$W(I_{уст}) = \frac{4C\varepsilon^2}{2} = 2C\varepsilon^2$

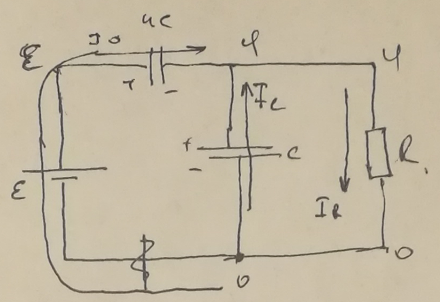
$I_0 = 4Cu'$

$q_0 = 4Cu$

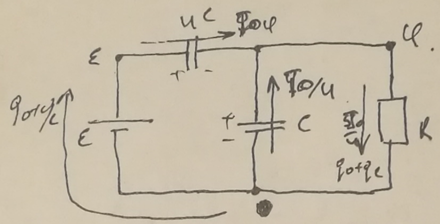
$q = Cu''$

$U_{4C} = \varepsilon - \varphi$

$U_C = \varphi$



$U_R = \frac{5I_0 R}{4}$



$\cancel{q_0 = CU}$

$q_0 = 4C \cdot (\varepsilon - \varphi)$

$q = C(\varphi).$

$\varphi = \frac{q}{C}$

$q_0 = 4C \cdot \varepsilon - 4C \cdot \frac{q}{C} =$

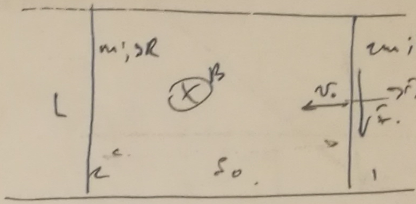
$q_0 = \overset{const}{4C\varepsilon} - 4q$

$I_0 = 4I$

$I = \frac{I_0}{4}.$

№4

~~4. $v_1 \to 0$.~~



$I = \mathcal{E}_i = vB\ell$

$I = \frac{vB\ell}{4R}$

$F_A = \frac{vB\ell}{4R}\cdot \ell \cdot B = \frac{vB^2\ell^2}{4R}$

$2ma = \frac{vB^2\ell^2}{4R}$

1) $a = \frac{vB^2\ell^2}{8mR}$

$v_{отн}^2 \cdot \Delta t$

$\frac{B^2\ell^2}{4R}\cdot(\Delta X \cdot v_{отн})$.

$Q = U\cdot \Delta q$ $\quad \mathcal{E}_i = -\varphi'$

$\mathcal{E}_i = \Phi' =$

$= B\ell \cdot x \cdot \cos\alpha'$

$Q =$

$\mathcal{E}_{i1} - \mathcal{E}_{i2} = U(t)$

$(v_1 - v_2)B\ell = U(v)$

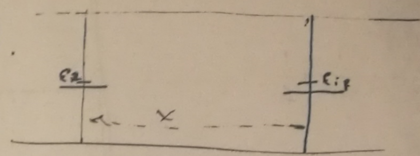
$Q = \frac{U^2(v)}{R}\Delta t =$ $\quad \frac{B^2\ell^2}{4R}$

$= \frac{B^2\ell^2}{4R}\sum (v_1 - v_2)^2 \cdot \Delta t =$ $\quad \frac{1}{3}mv_0^2 = \frac{B^2\ell^2}{4R}$.

ЗСИ: ~~$v_{отн}$~~ $= \frac{B^2\ell^2}{4R}\cdot \sum v_{отн}\Delta t \cdot =$ $\quad \frac{\Delta X^2}{\Delta t^2}$

$= \frac{B^2\ell^2}{4R}\cdot\left(\frac{0^2}{2} - \frac{v_0^2}{2}\right)$.

3).



$\mathcal{E}_{i1} = v_1 B\ell$

$\mathcal{E}_{i2} = v_2 B\ell$

$v_1 = v_2$

ЗСИ: $2mv_0 = 3mv_1 =$

$\Rightarrow v_1 = \frac{2v_0}{3}$

ЗСЭ: $\frac{2mv_0^2}{2} = \frac{3mv_1^2}{2} + Q$.

~~$v_0^2 = \frac{3}{2}v_1^2$~~

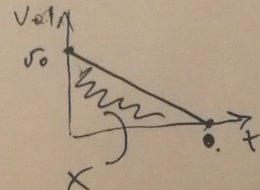
$mv_0^2 - \frac{3}{2}mv_1^2 = Q$

$mv_0^2 - \frac{3}{2}m\,\frac{4}{9}v_0^2 = Q$

$mv_0^2 - \frac{2}{3}mv_0^2 = Q$

$\frac{1}{3}mv_0^2 = Q$.

$v_{отн} = X(t)$.



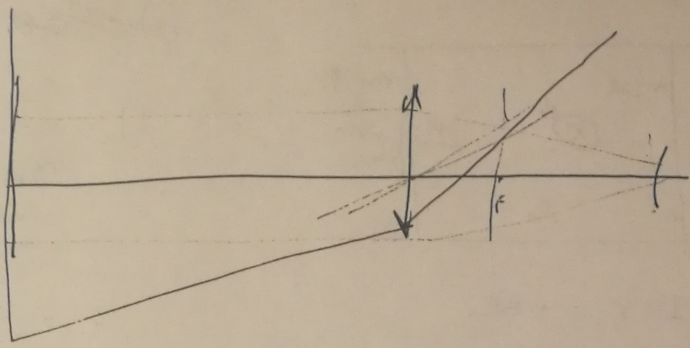
Черновик

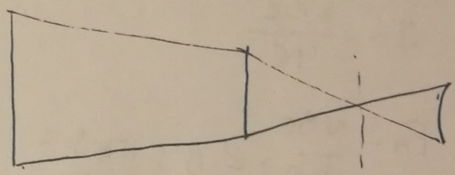
~~№4~~. №5.

$$\frac{1}{F} = \frac{1}{4F} + \frac{1}{f}$$

$$\frac{1}{f} = \frac{1}{F} - \frac{\cancel{1}}{4F} = \frac{3}{4F}$$

$$f = \frac{4F}{3} =$$

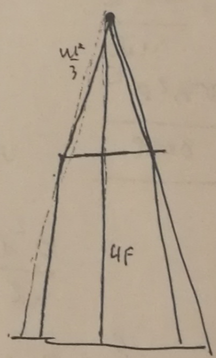


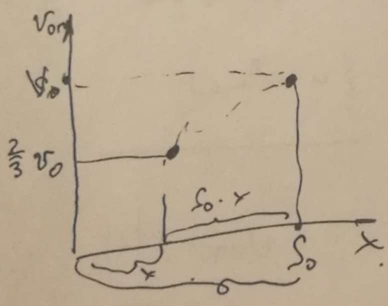


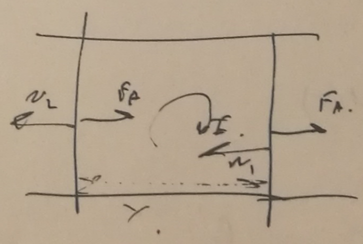
$$\frac{1}{F} = \frac{1}{4F} + \frac{1}{f}$$

$$\frac{1}{f} = \frac{1}{F} - \frac{1}{4F} = \frac{3}{4F}$$

$$f = \frac{4F}{3} =$$







$v_1 - v_2 = v_{отн}$

Δx. $\quad x_1 - x_2$!