Часть 1

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

Шифр: **21200225**

ID профиля: **296489**

Вариант 4

№1

α $(\cos\alpha = \frac{8}{17})$

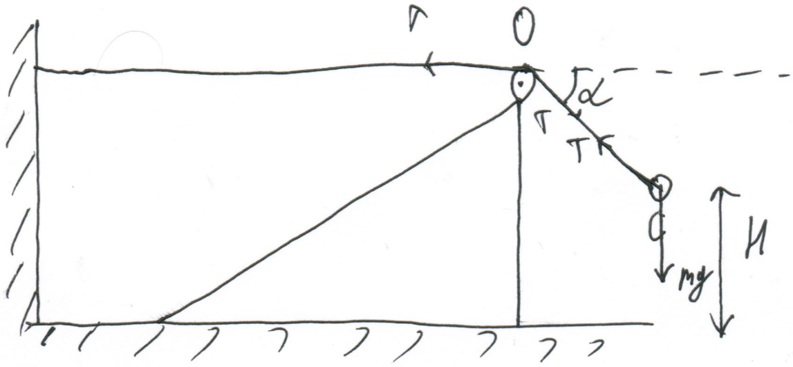
H

β − ?

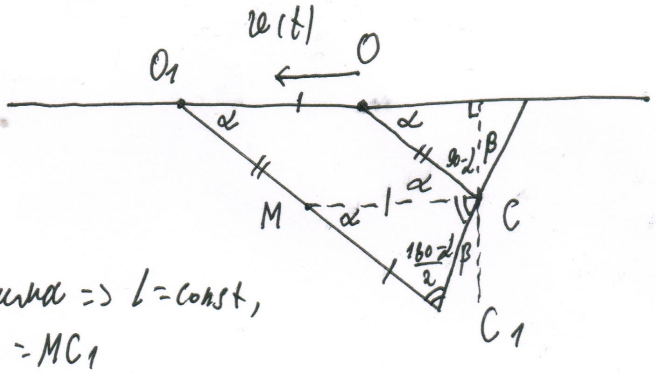
$a_{кл}$ − ?

$\frac{m_ш}{m_{кл}}$ − ?

t − ?



Рассмотрим движение точек O и C



$\beta + (90-\alpha) + \alpha + \frac{180-\alpha}{2} = 180$

$2\beta + 180 + 180 - \alpha = 180\cdot 2$

$\beta = \frac{\alpha}{2}$

$\sin\beta = \frac{3}{\sqrt{34}}$ $\quad \cos\beta = \frac{5}{\sqrt{34}}$

$\cancel{\cos\beta = \sqrt{\frac{21}{34}}}$ $\quad \operatorname{tg}\beta = \frac{3}{5}$

$\sin\alpha = \frac{15}{17}$

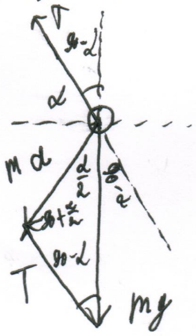
Т.к. нить нерастяжима => $l = const$,

(l − длина нити) => $OO_1 = MC_1$

Понятно, что $\vec{a} \parallel CC_1$ (т.к. в начале $v_ш = 0$)

$OO_1 = MC$ (в силу симметрии)

Рассмотрим шар:



$\frac{mg}{\sin(90+\frac{\alpha}{2})} = \frac{T}{\sin\frac{\alpha}{2}}$; $\frac{mg}{\cos\frac{\alpha}{2}} = \frac{T}{\sin\frac{\alpha}{2}}$

$T = mg\cdot\operatorname{tg}\frac{\alpha}{2}$

$m^2a^2 = m^2g^2 + m^2g^2\cdot\operatorname{tg}^2\frac{\alpha}{2} - 2m^2g^2\cdot\operatorname{tg}\frac{\alpha}{2}\cdot\sin\alpha$

$a_ш = g\sqrt{1+\operatorname{tg}^2\frac{\alpha}{2} - 2\operatorname{tg}\frac{\alpha}{2}\sin\alpha}$; $a_ш = g\sqrt{1+\frac{9}{25} - \frac{2\cdot 3\cdot 15}{5\cdot 17}}$

$= g\cdot\frac{8}{5}\sqrt{\frac{2}{17}}$

$a_н = a\cdot\cos(90-\frac{\alpha}{2}) = a\cdot\sin\frac{\alpha}{2}$

$a_н$ − ускорение шарика на нить (проекция)

Т.к. нить нерастяжима => $a_{кл} = a_н$; $a_{кл} = g\sqrt{1+\operatorname{tg}^2\beta - 2\operatorname{tg}\beta\cdot\sin\alpha}\cdot\sin\frac{\alpha}{2}$

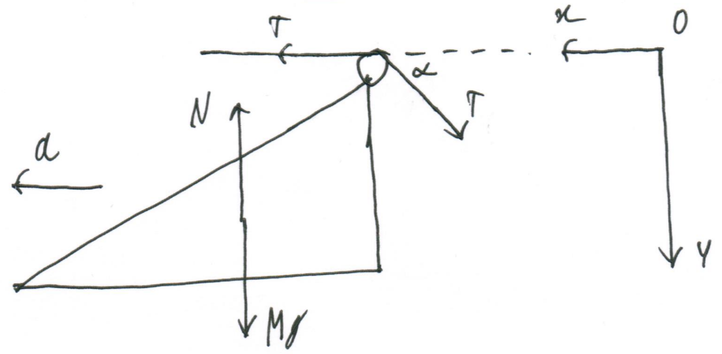
$a_{кл} = \frac{8}{5}\sqrt{\frac{2}{17}}\cdot\frac{3}{\sqrt{34}}g = \frac{8\cdot 3}{5}g\cdot\sqrt{\frac{2}{17\cdot 17\cdot 2}} = \frac{8\cdot 3}{5}g\cdot\frac{1}{17}$; $\cancel{a_{кл} = \frac{104}{85}g}$

Рассмотрим силы, действующие на клин. $a_{кл} = \frac{8\cdot 3}{5}g\cdot\frac{1}{17}$

1

$a_{кл} = \frac{24}{85}g$

Чистовик лист 2 из 3



$Ox:\ T - T\cdot\cos\alpha = Ma;\ T = mg\cdot tg\frac{\alpha}{2}$ (из прошлых задач)

$\cancel{mg(tg\frac{\alpha}{2}}$ $mg\cdot tg\frac{\alpha}{2}(1-\cos\alpha) = M\cdot\frac{24}{85}\cancel{\frac{104}{85}}g$; $\frac{m}{M} = \frac{24}{85}\cdot\frac{1}{tg\frac{\alpha}{2}(1-\cos\alpha)}$

$\frac{m}{M} = \frac{\cancel{104}\ 24}{85}\cdot\frac{1}{\frac{3}{5}\cdot\frac{9}{17}} = \cancel{\frac{104\cdot5\cdot17}{85\cdot3\cdot9} = \frac{104}{27}},\ \cancel{\frac{m}{M} = \frac{104}{27}}$

$\frac{m}{M} = \frac{24}{85}\cdot\frac{5\cdot17}{3\cdot9} = \frac{8}{9}$

$\frac{m}{M} = \frac{8}{9}$

~~Найдём теперь отношение~~

Мы знаем ускорение шара => можем найти время t

$H = v_0 t + \frac{a_y t^2}{2},\ v_0 = 0;\ H = \frac{a_y t^2}{2};\ t = \sqrt{\frac{2H}{a_y}}$

$a_y = a_ш\cdot\cos\frac{\alpha}{2};\ a_y = g\cdot\frac{8}{\cancel{\ }}\sqrt{\frac{2}{17}}\cdot\frac{5}{\sqrt{34}} = 8g\cdot\sqrt{\frac{2}{17\cdot2\cdot17}} = \frac{8}{17}g$

$t = \sqrt{\frac{2H}{8g}\cdot17} = \frac{1}{2}\sqrt{\frac{17H}{g}};\ t = \frac{1}{2}\sqrt{\frac{17H}{g}}$

2

Чистовик лист 3 из 3

№2

$i=3$ (He)

ν

T_0

$C(T) = \frac{9}{5} R \cdot \frac{T}{T_0}$

$Q_1 (Q_1 > 0)$ — ?

T_{min} — ? (A_2 — min)

A_{min} — ?

$dQ = \nu \cdot C \cdot dT$; $dQ = \nu \cdot \frac{9}{5} R \cdot \frac{1}{T_0} \cdot T \cdot dT$ (проинтегрируем данное выражение

$Q = \nu \frac{9}{5} R \cdot \frac{1}{T_0} \cdot \left(\frac{T^2}{2} - \frac{T_0^2}{2}\right) = \frac{9\nu R}{10 T_0}(T^2 - T_0^2)$ $\qquad \underline{Q(T) = \frac{9\nu R}{10 T_0}(T^2 - T_0^2)}$

$Q\left(\frac{3}{4}T_0\right) = \frac{9\nu R}{10 T_0}\left(\frac{9}{16}T_0^2 - T_0^2\right) = \frac{9\nu R}{10 T_0} \cdot \left(-\frac{7}{16} T_0^2\right) = -\frac{63 \nu R T_0}{160}$

$Q\left(\frac{3}{4}T_0\right)$ — кол-во тепла, которое газ получил $\Rightarrow Q_1 = -Q\left(\frac{3}{4}T_0\right)$

$Q_1 = \frac{63 \nu R T_0}{160}$

$Q = A_2 + \Delta U$; $Q(T) = \frac{9\nu R}{10 T_0}(T^2 - T_0^2) = A_2 + \frac{3}{2}\nu R (T - T_0)$

~~$A_2 = \frac{3\nu R}{2}(T - T_0)\left(\frac{3}{5T_0}(T + T_0) - T + T_0\right)$~~ $\quad A_2 = \frac{3\nu R}{2}(T - T_0)\left(\frac{3}{5T_0}(T + T_0) - 1\right)$

$A_2 = \frac{3\nu R}{2}(T - T_0)\left(\frac{3T}{5T_0} - \frac{2}{5}\right)$; $A_2 = \frac{3\nu R}{2}\left(\frac{3T^2}{5T_0} - \frac{2}{5}T - \frac{3}{5}T + \frac{2}{5}T_0\right)$

$A_2 = \frac{3\nu R}{2}\left(\frac{3}{5T_0} \cdot T^2 - T + \frac{2}{5}T_0\right)$ — парабола с ветвями вверх $\Rightarrow$ минимум A_2 — вершина параб

$T_{min} = \frac{5}{6} T_0$ $\qquad A_2\left(\frac{5}{6}T_0\right) = \frac{3\nu R}{2}\left(\frac{5}{6}T_0 - T_0\right)\left(\frac{3}{\cancel{5T_0}} \cdot \frac{\cancel{5}}{6}T_0 - \frac{2}{5}\right) = \frac{3\nu R}{2} \cdot \left(-\frac{1}{6_2}T_0\right) \cdot \frac{1}{10} = -\frac{\nu R T_0}{40}$

$A_{min} = -\frac{1}{40} \nu R T_0$

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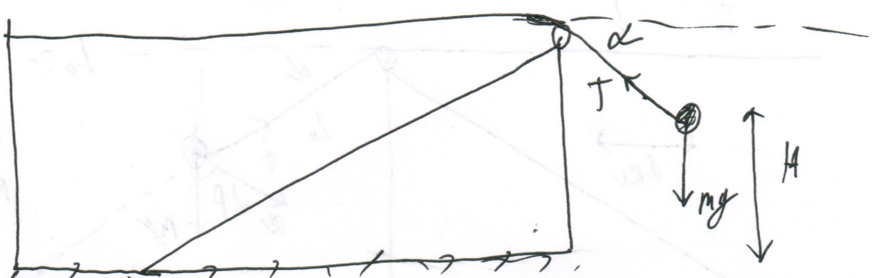
Черновик

α % $(\cos\alpha = \frac{8}{17})$

u

p - ?

$\alpha_{кн}$ - ?



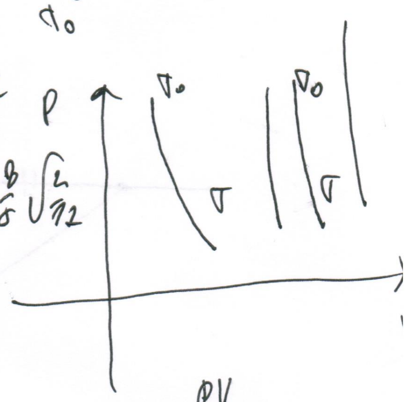
$\frac{9}{16} - 1 = \frac{9}{16} - \frac{16}{16}$

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

$\int_{v_0}^{v} v \cdot dv = \frac{v^2}{2} - \frac{v_0^2}{2}$

$\sqrt{1 + \frac{9}{25} - 2 \cdot \frac{3}{5} \cdot \frac{15}{17}} =$

$= \sqrt{\frac{25 \cdot 17 + 9 \cdot 17 - 2 \cdot 3 \cdot 15 \cdot 5}{25 \cdot 17}} = \sqrt{\frac{425 + 153 - 450}{25 \cdot 17}} = \sqrt{\frac{64 \cdot 2}{25 \cdot 17}} = \frac{8}{5}\sqrt{\frac{2}{17}}$



№ 2

ν

T_0

$C(T) = \frac{9}{5} R \cdot \frac{T}{T_0}$

$dQ = \nu \cdot C \cdot \Delta T$; $dQ = \nu \cdot \frac{9}{5} R \cdot \frac{1}{T_0} \cdot T \cdot dT$

$Q = \frac{9\nu R}{5T_0}\left(\frac{T^2}{2} - \frac{T_0^2}{2}\right)$ $Q\left(\frac{3}{4}T_0\right) =$

$= \frac{9\nu R}{5T_0}\left(\frac{9T_0^2}{32} - \frac{16T_0^2}{32}\right) = -\frac{9\nu R}{5T_0} \cdot \frac{7T_0^2}{32} = -\frac{63\nu R T_0}{160}$

$\frac{9\nu R}{10T_0}(T^2 - T_0^2) - \frac{3}{2}\nu R(T - T_0) = A_2$; $A_2 = \frac{3\nu R}{2}\left(\frac{3}{5T_0}(T+T_0) - 1\right)(T - T_0)$

$A_2 = \frac{3\nu R}{2}(T - T_0)\left(\frac{3T}{5T_0} + \frac{3}{5} - 1\right) = \frac{3\nu R}{2}(T - T_0)\left(\frac{3T}{5T_0} - \frac{2}{5}\right)$

$= \frac{3\nu R}{2}\left(\frac{3T^2}{5T_0} - \frac{2}{5}T - \frac{3}{5}T + \frac{2}{5}T_0\right) = \frac{3\nu R}{2}\left(\frac{3}{5T_0} \cdot T^2 - T + \frac{2}{5}T_0\right)$ $A' = \frac{3\nu R}{2}\left(\frac{6T}{5T_0} - 1\right) = 0$

$\frac{6T}{5T_0} = 1$; $T = \frac{5}{6}T_0$ $\quad \frac{-1}{\frac{6}{5T_0}} = \frac{5T_0}{6}$ $\quad \frac{1}{2} - \frac{2}{5} = \frac{5 - 4}{10} = \frac{1}{10}$

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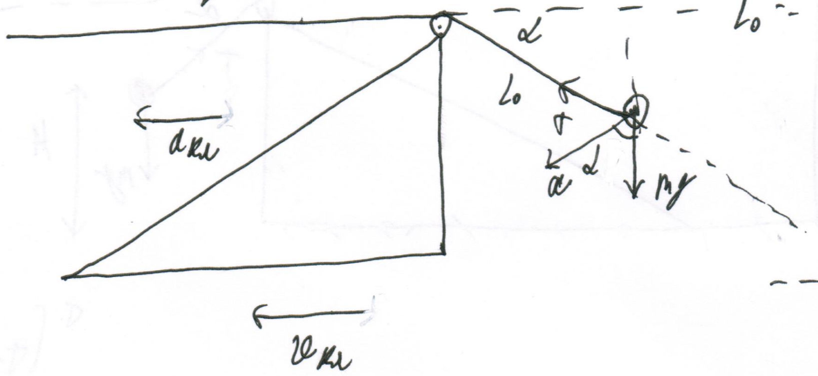
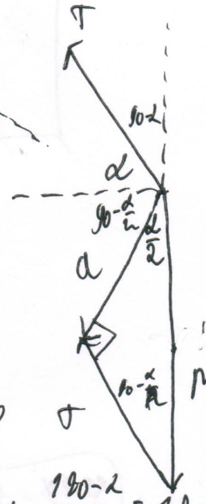
N 1

$L = L_1 - v(t) \cdot t$

$\alpha \ (\cos\alpha = \frac{8}{17})$

H

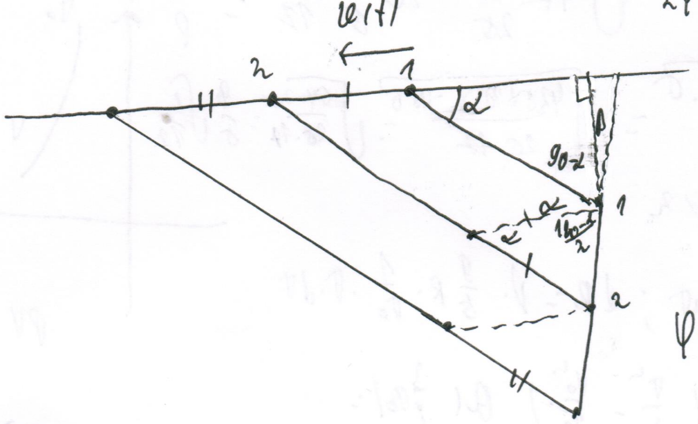




$\beta + 90 - \alpha + \frac{\alpha}{2} = 180$

$2\varphi + 180 - \alpha = 360$

T



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

$2\beta + \cancel{180} + \cancel{180} - \alpha = \cancel{360}$

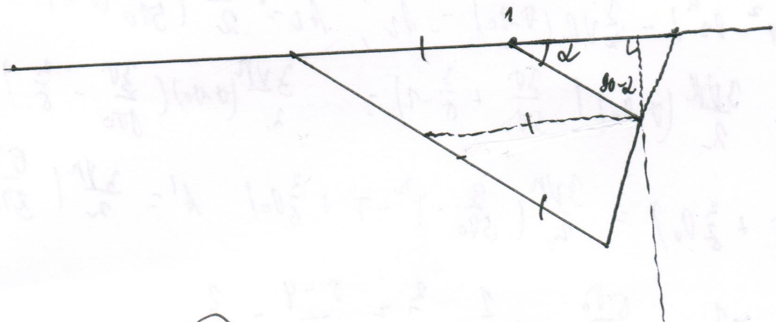
$\beta = \frac{\alpha}{2}$

$\varphi = \frac{180+\alpha}{2}$

$\cos\alpha = 1 - 2\sin^2\frac{\alpha}{2}$

$\sin\frac{\alpha}{2} = \sqrt{\frac{1-\cos\alpha}{2}}$

$\sin\frac{\alpha}{2} = \sqrt{\frac{1-\frac{8}{17}}{2}} = \sqrt{3}$



$\cancel{m^2} a^2 = \cancel{m^2} g^2 + m^2 g^2 \cdot tg^2\frac{\alpha}{2} - 2m^2 g^2$

$\sqrt{1 - \frac{64}{289}}$

$a^2 = g^2 + g^2 tg^2\frac{\alpha}{2} - 2\,tg\frac{\alpha}{2} \cdot \sin\alpha \cdot g^2$

$a = 10\sqrt{1 + \frac{9}{25} + 2 \cdot \frac{3}{5} \cdot \frac{15}{17}} =$

$\cos\beta = \sqrt{1 - \frac{9}{34}} = \sqrt{\frac{25}{34}}$

$\frac{153 + 425}{25 \cdot 17}$

$a = \sqrt{\frac{425 + 9 \cdot 17}{25 \cdot 17} - 2 \cdot 3 \cdot 15 \cdot 5}$

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Часть 2

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

Шифр: **21200225**

ID профиля: **296489**

Вариант 4

Чистовик. Лист 1 из 3

№3

$C_1 = 5C$

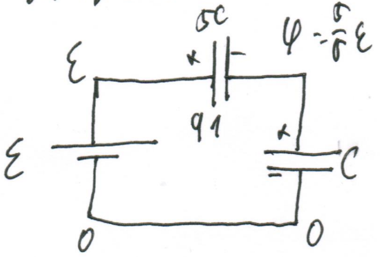
$C_2 = C$

$I_1 - ?$

$Q - ?$

$I_R\ (I_{C_2} = I_0) - ?$

Уст. режим:



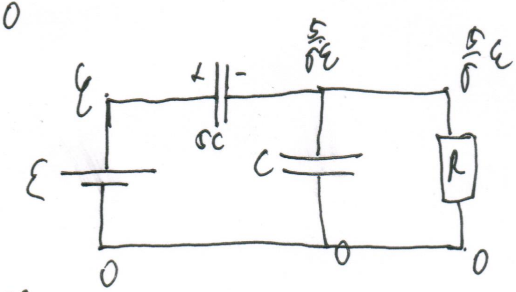
$(\varepsilon - \varphi)\cdot 5C = \varphi C$

$5\varepsilon - 5\varphi = \varphi;\ \varphi = \frac{5}{6}\varepsilon$

$q_1 = (\varepsilon - \frac{5}{6}\varepsilon)\cdot 5C = \frac{5C\varepsilon}{6}$

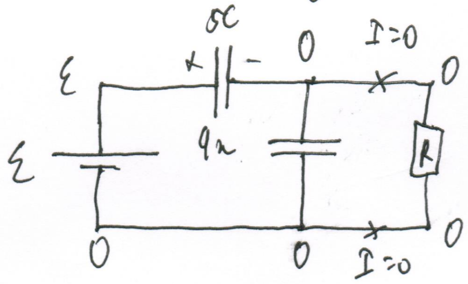
$W_1 = \frac{5C\cdot(\frac{1}{6}\varepsilon)^2}{2} + \frac{C\cdot(\frac{5}{6}\varepsilon)^2}{2} = \frac{5C\varepsilon^2}{72} + \frac{25C\varepsilon^2}{72} = \frac{5C\varepsilon^2}{12}$

Только замкнули:



$I_1 = \frac{5\varepsilon}{6R}$

Режим установился:

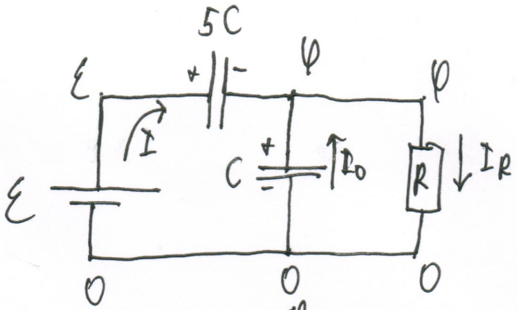


$q_2 = 5C\varepsilon$

$A_б = (q_2 - q_1)\varepsilon = (5C\varepsilon - \frac{5\varepsilon C}{6})\varepsilon = \frac{25C\varepsilon^2}{6}$ $\quad W_2 = \frac{5C\varepsilon^2}{2}$

ЗСЭ: $W_1 + A_б = W_2 + Q$; $\frac{5C\varepsilon^2}{12} + \frac{50C\varepsilon^2}{12} = \frac{30C\varepsilon^2}{12} + Q$; $Q = \frac{25C\varepsilon^2}{12}$

Через C_2 ток I_0:



$I_R = \frac{\varphi}{R}$

$I + I_0 = I_R;\ I = I_R - I_0$

$P_б = I\varepsilon > 0$

$W_{5C} = \frac{q_{5C}^2}{2\cdot 5C}$ $\quad W_C = \frac{q_C^2}{2\cdot C}$

$W'_{5C} = \frac{2q_{5C}\cdot I}{2\cdot 5C}$ $\quad W'_C = -\frac{2q_C\cdot I_0}{2C}$

$P_R = \frac{\varphi^2}{R}$

$(I_R - I_0)\varepsilon = (\varepsilon - \varphi)\cdot(I_R - I_0) - \varphi\cdot I_0 + \frac{\varphi^2}{R}$

$I_R = \frac{\varphi}{R}$

$\cancel{\frac{\varphi\varepsilon}{R}} - I_0\varepsilon = \cancel{\frac{\varepsilon\varphi}{R}} - \varepsilon I_0 - \cancel{\frac{\varphi^2}{R}} + \cancel{\varphi I_0} - \cancel{\varphi I_0} + \cancel{\frac{\varphi^2}{R}}$

Чистовик. Лист 2 из 3

№4

B

l

1 – 2m, R

2 – $\frac{1}{2}$m, 5R

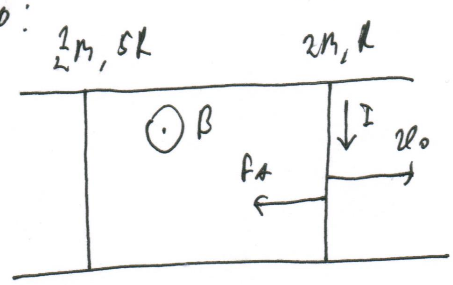
v_0

a_1 – ?

$v_{уст}$ – ?

Δx – ?

Начало:

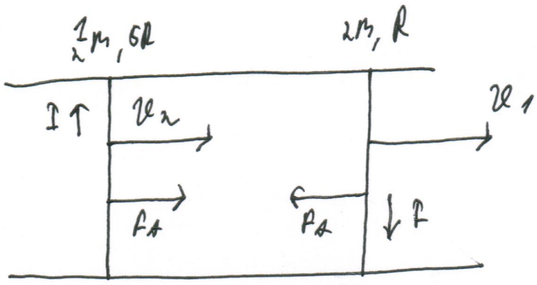


$\varepsilon_i = v_0 B \cdot l$; $I_0 = \frac{v_0 B l}{5R+R} = \frac{v_0 B l}{6R}$

$F_A = B \cdot I \cdot l = \frac{v_0 B^2 l^2}{6R}$; $F_A = 2m \cdot a_1$

$\frac{v_0 B^2 l^2}{6R} = 2m \cdot a_1$; $a_1 = \frac{v_0 B^2 l^2}{12 m R}$

Случайный момент:



$a_1 = \frac{F}{2m} = a$; $a_2 = \frac{F}{\frac{1}{2}m} = 4a$

$v_0 - \Delta v_1 = \Delta v_2$; $\Delta v_2 = 4\Delta v_1$ (следует из соотношения ускорений)

$v_0 - \Delta v_1 = 4\Delta v_1$; $\Delta v_1 = \frac{1}{5} v_0$

$v_{уст} = v_0 - \frac{1}{5} v_0 = \frac{4}{5} v_0$

$v_{уст} = \frac{4}{5} v_0$

$\varepsilon_{i1} = v_1 B l$

$\varepsilon_{i2} = v_2 B l$

$\varepsilon_i = Bl(v_1 - v_2)$; $I = \frac{Bl(v_1 - v_2)}{6R}$

$\varepsilon_i = B \cdot \dot{S}$, S – площадь

$F_1 = \frac{v_1 \cdot B^2 l^2}{6R}$; $a_1 = \frac{v_1 B^2 l^2}{12mR}$, $F_2 = \frac{v_2 B^2 l^2}{6R}$, $a_2 = \frac{v_2 B^2 l^2}{3mR}$

$dv_1 = -a_1 \cdot dt$; $dv_1 = -\frac{B^2 l^2}{12mR} \cdot v_1 \cdot dt$; $\frac{1}{5} v_0 = \frac{B^2 l^2}{12mR} \cdot S_1$; $S_1 = \frac{12mR v_0}{5B^2 l^2}$

$dv_2 = \frac{B^2 l^2}{3mR} \cdot v_2 \cdot dt$;

$I = \frac{Bl \cdot (v_1 - v_2)}{6R}$ $F_1 = \frac{B^2 l^2 (v_1 - v_2)}{6R}$; $a_1 = \frac{B^2 l^2 (v_1 - v_2)}{12mR}$

$dv_1 = -a_1 \cdot dt$; $dv_1 = -\frac{B^2 l^2}{12mR} \cdot (v_1 - v_2)\, dt$ (суммируем)

$-\frac{1}{5} v_0 = -\frac{B^2 \cdot l^2}{12mR} \cdot \Delta x$; $\Delta x = \frac{12mR v_0}{5B^2 l^2}$; $\Delta x = \frac{12mR v_0}{5B^2 l^2}$

21200225 (U296489 M1266317)

№ 5

$F = 24$ см

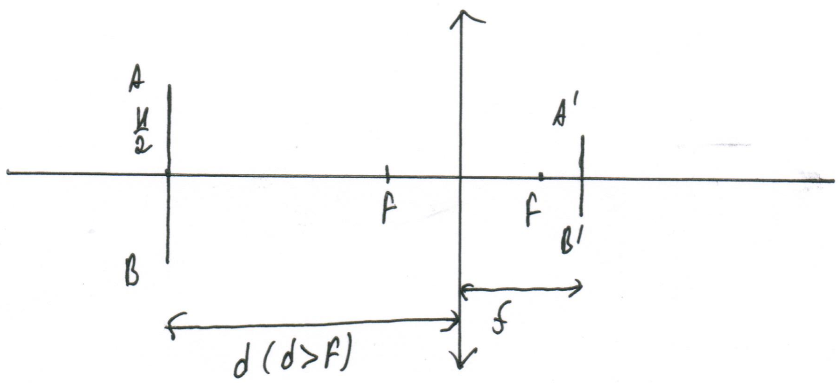
$H = 9$ см (H – диаметр)

$d = 96$ см

$L = 24$ см

x – ?

$D_м$ – ?

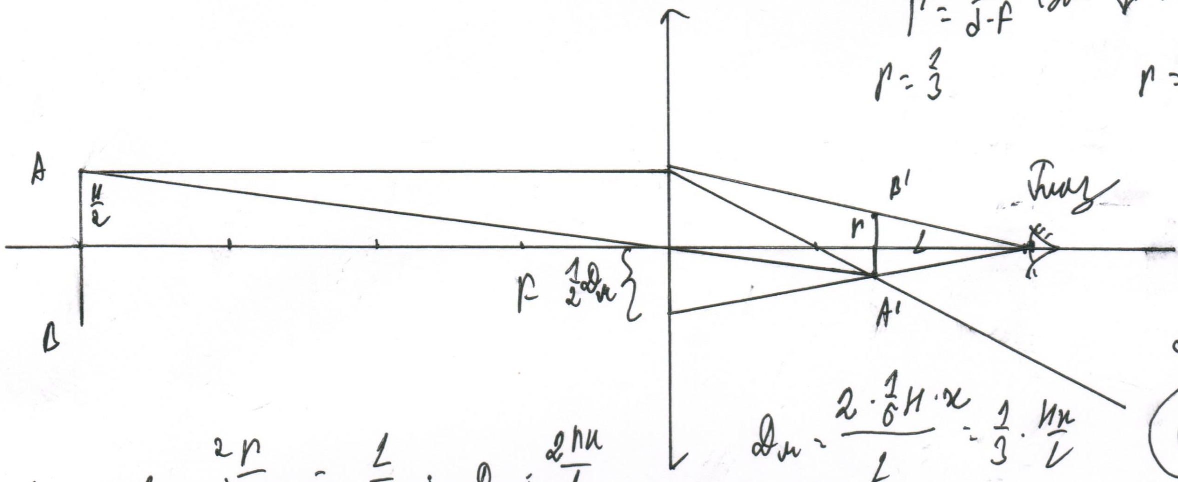


$$\frac{1}{F} = \frac{1}{d} + \frac{1}{f} ; \quad f = \frac{F}{d-F} \cdot d = \frac{24}{72} \cdot 96 \ \cancel{= 8 (см)} = 32 \text{ см}$$

$$x = f + L = 32 + 24 = 56 ; \quad x = 56 \text{ (см)}$$

$\Gamma = \frac{f}{d-F}$ (для ↕ при $d > F$)

$\Gamma = \frac{1}{3}$ $\qquad r = \Gamma \cdot \frac{H}{2} = \frac{1}{6} H$

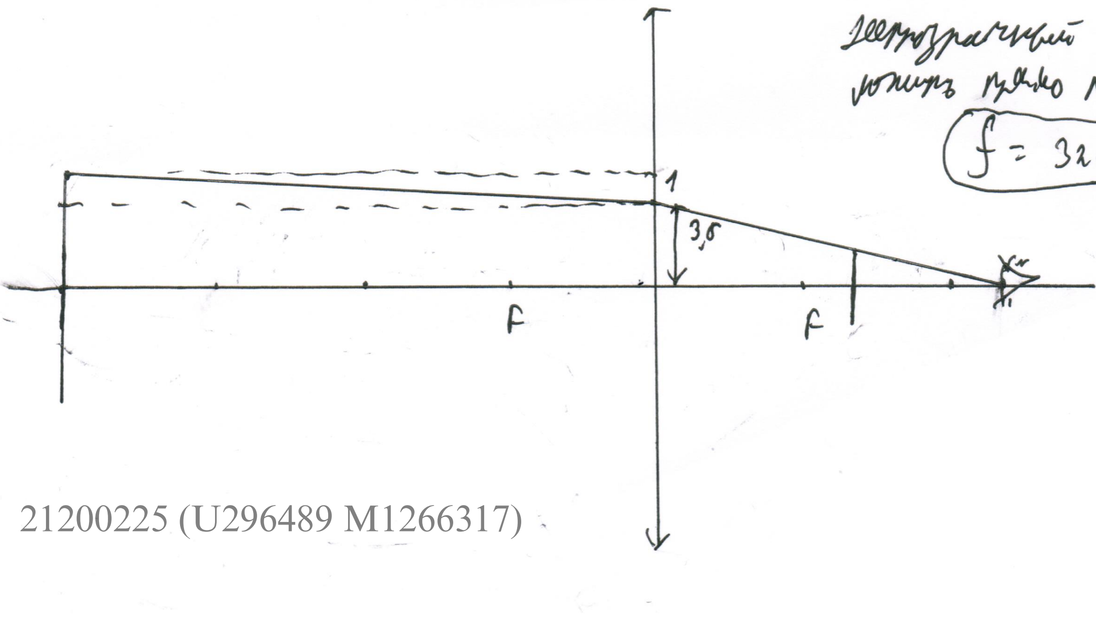


Из подобия: $\frac{2r}{\frac{1}{2} D_м} = \frac{L}{x}$; $D_м = \frac{2rx}{L}$

$$D_м = \frac{2 \cdot \frac{1}{6} H \cdot x}{L} = \frac{1}{3} \cdot \frac{Hx}{L}$$

$$D_м = \frac{1}{3} \cdot \frac{9 \cdot 56}{24} = 7$$

$D_м = 7$ (см)



Непрозрачный экран следует расположить прямо перед изображением A'

$f = 32$ см

21200225 (U296489 M1266317)

Черновик

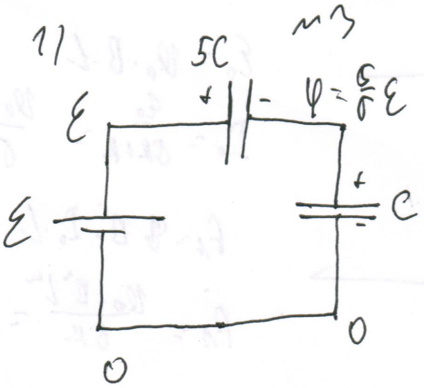
№3

$C_1 = 5C$

$C_2 = C$

$\mathcal{E}$

1)



$(\mathcal{E}-\varphi)\cdot 5C = \varphi C$

$5\mathcal{E} = 6\varphi; \quad \varphi = \frac{5}{6}\mathcal{E}$

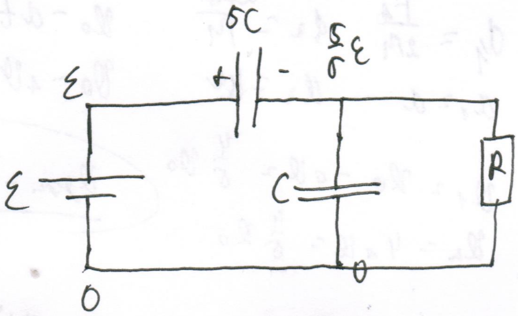
$q_1 = 5C \cdot \frac{1}{6}\mathcal{E} = \frac{5C\mathcal{E}}{6}$

$W_{10} = \frac{5C(\frac{1}{6}\mathcal{E})^2}{2} = \frac{5C\mathcal{E}^2}{72}$

$W_{11} = \frac{C\cdot(\frac{5}{6}\mathcal{E})^2}{2} = \frac{25C\mathcal{E}^2}{72}$

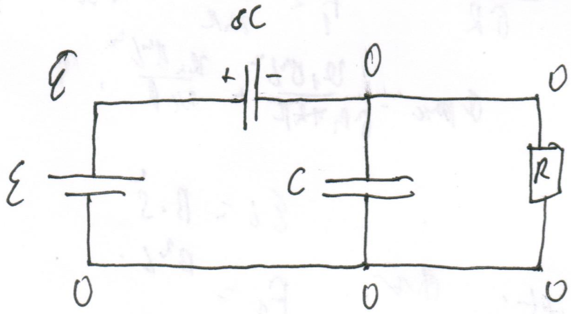
$W_1 = \frac{30}{72} = \frac{15}{36} = \frac{5}{12}$

2)



$I_0 = \frac{5\mathcal{E}}{6R}$

3)

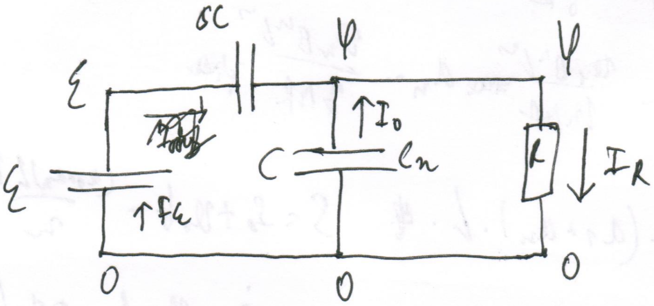


$q_2 = 5C\mathcal{E} \quad W_2 = \frac{5C\mathcal{E}^2}{2}$

$A_\delta = \mathcal{E}(q_2 - q_1) = \mathcal{E}\cdot\left(\frac{30C\mathcal{E}}{6} - \frac{5C\mathcal{E}}{6}\right) = \frac{25C\mathcal{E}^2}{6}$

$W_1 + A_\delta = W_2 + Q; \quad \frac{5C\mathcal{E}^2}{12} + \frac{50C\mathcal{E}^2}{12} = \frac{30C\mathcal{E}^2}{12} + Q; \quad Q = \frac{25C\mathcal{E}^2}{12}$

4)



$I_R = \frac{\varphi}{R} \quad I_0 + I_\mathcal{E} = I_R \quad I_\mathcal{E} = I_R - I_0$

$W_{5C} = \frac{(\mathcal{E}-\varphi)^2\cdot 5C}{2} = \frac{q_{5C}^2}{10C} \quad W_C = \frac{C\cdot\varphi^2}{2} = \frac{q_0^2}{2C}$

$P_\mathcal{E} = P_{5C} + P_C + P_R; \quad I_{5C}\cdot\mathcal{E} = \frac{2q_{5C}\cdot I_{5C}}{5\cdot 10C} + \frac{2q_C\cdot I_0}{2C} + I_R^2\cdot R$

$(I_R - I_0)\mathcal{E} = (\mathcal{E}-\varphi)(I_R - I_0) - I_0\cdot\varphi + I_R^2 R$

$\mathcal{E}(I_R - I_0) = (\mathcal{E}-\varphi)(I_R - I_0) + I^2 R - \varphi I_0$

$\frac{\mathcal{E}\varphi}{R} - \mathcal{E}I_0 = \mathcal{E}\cdot\frac{\varphi}{R}$

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№4

B

L

$1 - 2m, R$

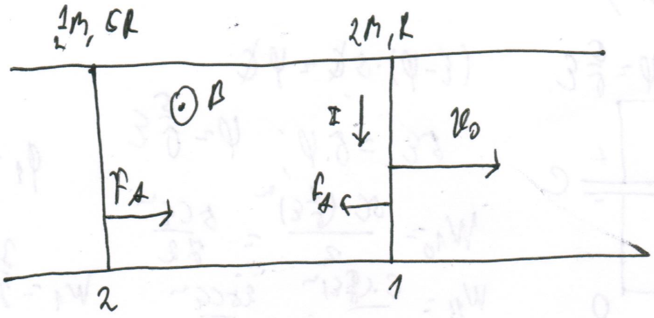
$2 - \frac{1}{2}m, 5R$

v_0

$a_1 - ?$

$v_{уст} - ?$

$\Delta S - ?$



$\mathcal{E}_0 = v_0 \cdot B \cdot L$

$I_0 = \frac{\mathcal{E}_0}{5R+R} = \frac{v_0 B L}{6R}$

$F_A = q\, B \cdot I_0 \cdot L$

$F_A = \frac{v_0 \cdot B^2 L^2}{6R} = 2m \cdot a_1$

$$\boxed{a_1 = \frac{v_0 B^2 L^2}{12 m R}}$$

$\cancel{v_0 - ?}$

$a_1 = \frac{F_A}{2m}$ $a_2 = \frac{2F_A}{m}$

$a_1 = a$ $a_2 = 4a$

$v_0 - at = 4a \cdot t$

$v_0 - \Delta v = 4\Delta v$; $\Delta v = \frac{1}{5} v_0$

$v_1 = v_0 - \Delta v = \frac{4}{5} v_0$

$v_2 = 4\Delta v = \frac{4}{5} v_0$

$$\boxed{v_{уст} = \frac{4}{5} v_0}$$

$\mathcal{E}_{i_1} = v_1 B L$

$\mathcal{E}_{i_2} = v_2 B L$

$\mathcal{E}_i = BL(v_1 - v_2)$ $I = \frac{BL(v_1 - v_2)}{6R}$ $F_1 = \frac{v_1 B^2 L^2}{12R}$ $F_2 = \frac{v_2 B^2 L^2}{12R}$

$\cancel{\mathcal{E}_i = BL \cdot S}$ $\mathcal{E}_i = B \cdot \dot{S}$

$a_{отн} = \frac{v_1 B^2 L^2}{6m \cdot 12R} + \frac{v_2 B^2 L^2}{24R}$;

$I = \frac{B}{6R} \cdot \dot{S}$; $I \cdot dt = \frac{B}{6R} \dot{S}\, dt$

$\mathcal{E}_i = B \cdot \dot{S}$

$F_1 = \frac{B^2 L}{}$

$\Phi' = \mathcal{E}_i$; $\frac{B \cdot dS}{dt} = I \cdot R$; $B \cdot dS = R \cdot I \cdot dt$;

$v_1 = v_0 - a_1 \cdot dt$ $F_1 = \frac{v_1 B^2 L^2}{6R}$ $F_2 = \frac{v_2 B^2 L^2}{6R}$

$a_1 = \frac{v_1 B^2 L^2}{12 m R}$ $a_2 = \frac{v_2 B^2 L^2}{3 m R}$

$v = v_0 - a_1 \cdot dt$ $\frac{30}{5} - \frac{5}{5} =$

$\dot{S} = (a_1 + a_2) \cdot L \cdot t$ $S = S_0 + v_0 t - \frac{(a_1 + a_2) L t^2}{2}$

$\Delta v_1 = \cancel{v_0} - \frac{v_1 \cdot B^2 L^2}{12 m R} \cdot dt$

$\dot{S} = 5a \cdot L \cdot t$ $v_1 = v_0 - \Delta v$ $\dot{S} = v_0 \cdot L - 5a \cdot L \cdot dt$

$v_2 = 4\Delta v$ $5a \cdot L = \frac{5 v_1 B^2 L^3}{12 m R}$

$-\frac{1}{5} v_0 = -\frac{B^2 L^2}{12 m R} \cdot S_1$

$\dot{S} =$

$-\frac{1}{5} v_0 = -\frac{B^2 L^2}{12 m R} \cdot S_1$

$\frac{v_2 \cdot B^2 L^2}{3 m R} \cdot dt$ $\frac{4}{5} v_0 = \frac{B^2 L^2}{3 m R} \cdot S_2$

$S_1 = \frac{12 m R v_0}{5 B^2 L^2}$

$S_2 = \frac{12 m R v_0}{}$

$v_1 = v_0 - \frac{v_1 B^2 L^2}{12 m R} \cdot dt$