Часть 1

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

Шифр: **21201589**

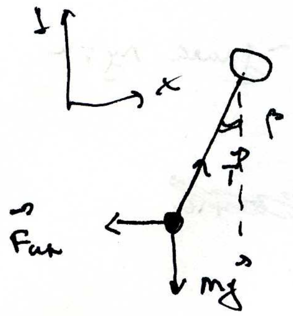
ID профиля: **800663**

Вариант 6

ЧИСТОВИК Вариант 11-06 (1)

1. $\vec{A}$ – ускорение клина

1.)



II з-н: $\vec{T} + \vec{F}_{ин} + m\vec{g} = m\vec{a}$

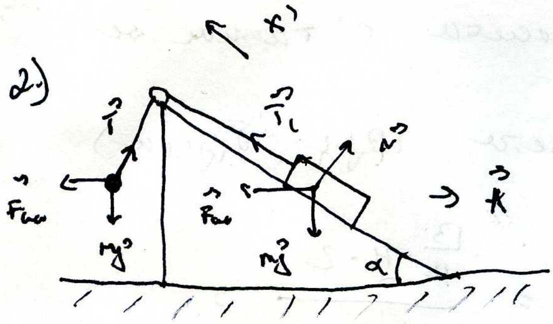
Перейдём в НСО движ. клина

„y": $T \cdot \cos\beta - mg = 0 \Leftarrow T = \dfrac{mg}{\cos\beta}$

„x": $-mA + T \cdot \sin\beta = 0$

$\Rightarrow A = \dfrac{T \cdot \sin\beta}{m} = \dfrac{mg \cdot tg\beta}{m} = g \cdot tg\beta = \dfrac{5}{12} g$

2.)



Опять перейдём в НСО клина

II з-н: $\vec{T}_1 + \vec{N} + \vec{F}_{ин} + m\vec{g} = m\vec{a}$

т.к. нить нерастяжима $|\vec{T}_1| = |\vec{T}|$

„x'": $T + 2mA \cdot \cos\alpha - 2mg \cdot \sin\alpha = 2ma \Leftrightarrow$

$mg \cdot \dfrac{13}{12} + 2 \cdot \dfrac{4}{5} \cdot \dfrac{5}{12} \cdot g \cdot m - mg \cdot 2 \cdot \dfrac{3}{5} = 2ma \Leftrightarrow$

$2a = g\left(\dfrac{13}{12} + \dfrac{2}{3} - \dfrac{6}{5}\right) \Leftrightarrow 2a = g \cdot \dfrac{65 + 40 - 72}{60} \Leftrightarrow$

$\Leftrightarrow a = g \cdot \dfrac{105 - 72}{120} \Leftrightarrow a = g \dfrac{33}{120} \Leftrightarrow a = g \cdot \dfrac{11}{60}$

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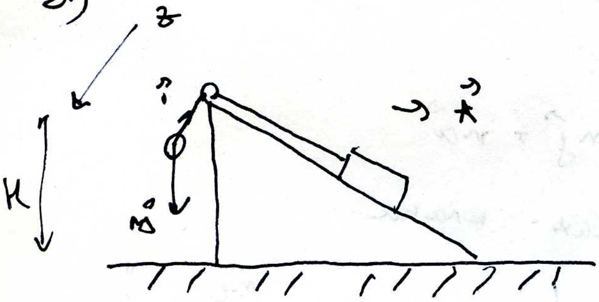
Чистовик Вариант 11-06 2

3.)



$S = \frac{H}{\cos\beta} = \frac{13}{12} H$ — длина пути

~~[illegible]~~

~~[illegible]~~

~~[illegible]~~

Нить опускается с таким же ускорением, с которым движется 1ый (брусок)

Поэтому $\frac{at^2}{2} = S \Rightarrow t^2 = \frac{2S}{a} = \frac{\frac{13}{12}\cdot H \cdot 2}{\frac{11}{60} g} =$

$= \frac{H}{g}\cdot\frac{13}{6}\cdot\frac{60}{11} = \frac{H}{g}\cdot\frac{130}{11} \Leftarrow$

$\Rightarrow t = \sqrt{\frac{130 H}{11 g}}$

<u>Ответ:</u> 1.) $\frac{5}{12} g$ 2.) $\frac{11}{60}\cdot g$ 3.) $\sqrt{\frac{130 H}{11 g}}$

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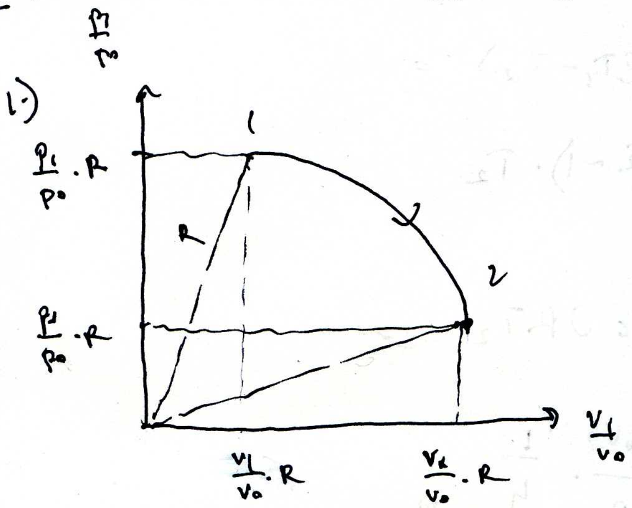
ЧИСТОВИК Вариант 11-06 (3)

2. в кружке. Будем данные для удобства считать $R=1$

1.)



$$\frac{p_1}{p_0} = R\cdot\cos 22{,}5^\circ$$

$$\frac{p_2}{p_0} = R\cdot\sin 15^\circ$$

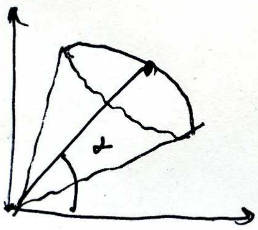
$$\frac{V_1}{V_0} = R\cdot\sin 22{,}5^\circ$$

$$\frac{V_2}{V_0} = R\cdot\cos 15^\circ$$

$$\frac{p_1V_1}{T_1} = \frac{p_2V_2}{T_2} \Rightarrow \frac{T_1}{T_2} = \frac{p_1V_1}{p_2V_2} = \frac{\cos 22{,}5^\circ\cdot\sin 22{,}5^\circ}{\sin 15^\circ\cdot\cos 15^\circ} =$$

$$= \frac{\frac{1}{2}\cdot\sin 45^\circ}{\frac{1}{2}\cdot\sin 30^\circ} = \frac{\frac{\sqrt{2}}{2}}{\frac{1}{2}} = \sqrt{2} \approx 1{,}4$$

2.)



в произвольный момент

$$p = p_0\cdot\sin\alpha \qquad V = V_0\cdot\cos\alpha$$

$$A_{12} = \int p\,dV = \int p_0\cdot\sin\alpha\cdot\cos\alpha\cdot V_0\cdot d\alpha =$$

$$= p_0V_0\cdot\int_{\alpha_1}^{\alpha_2}\frac{\sin 2\alpha}{2}\,d\alpha = \frac{p_0V_0}{2}\cdot\int_{\alpha_1}^{\alpha_2}\sin 2\alpha\,d\alpha$$

$$\int\sin 2\alpha\,d\alpha = \frac{1}{2}\cdot\int\sin 2\alpha\,d(2\alpha) = \frac{1}{2}\cdot(-\cos 2\alpha)$$

$$A_{12} = \frac{p_0V_0}{4}\cdot(-\cos 2\alpha)\Big|_{67{,}5}^{75} = \frac{p_0V_0}{4}\cdot(-\cos 150^\circ + \cos 135^\circ) = -\frac{p_0V_0}{4}\cdot 2\cdot\sin\frac{285}{2}\cdot\sin\frac{15}{2}$$

ЧИСТОВИК Вариант 11-06 (4)

$2\to1$: $\underset{0}{\overset{\text{''}}{Q}} = A_{21} + \Delta U \Leftrightarrow A_{21} = -\Delta U =$

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

$$= \frac{5}{2}\nu R(\sqrt{2}-1)\cdot T_2$$

$$p_2V_2 = \nu R T_2 \Leftrightarrow p_0V_0\cdot\frac{\sin 30^\circ}{2} = \nu R T_2 \Leftrightarrow$$

$$\Leftrightarrow T_2 = \frac{p_0V_0}{\nu R}\cdot\frac{1}{4} \Rightarrow$$

$$\Rightarrow A_{21} = \frac{5(\sqrt{2}-1)}{2}\cdot\frac{p_0V_0}{4} = p_0V_0\cdot\frac{5(\sqrt{2}-1)}{8}$$

$$k = \frac{A_{12}}{A_{21}+A_{21}} = \frac{\frac{p_0V_0}{4}\cdot(\cos 135^\circ - \cos 150^\circ)}{\frac{p_0V_0}{8}\cdot5(\sqrt{2}-1)+(\cos 135^\circ-\cos 150^\circ)\frac{p_0V_0}{4}} =$$

$$= \frac{\cos 135^\circ - \cos 150^\circ}{\frac{5(\sqrt{2}-1)}{32}+\frac{\cos 135^\circ - \cos 150^\circ}{16}}$$

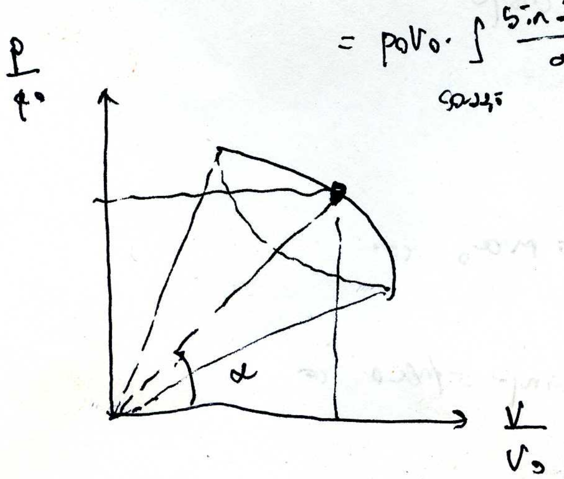
2.) $\underset{0}{\overset{\text{''}}{Q}} = A + \Delta U \Leftrightarrow C\cdot dT = p\cdot dV + \frac{5}{2}\nu R dT \Leftrightarrow p\cdot dV = -\frac{5}{2}\nu R dT$

Ответ: 1.) $\sqrt{2} \approx 1{,}41$ 3.) $\frac{\cos 135^\circ - \cos 150^\circ}{\frac{5(\sqrt{2}-1)}{32}+\frac{\cos 135^\circ-\cos 150^\circ}{16}}$

Черновик

$A = \int p\,dV = \int p_0 \cdot \sin\alpha \cdot V_0 \cdot \cos\alpha\, d\alpha =$

$= p_0 V_0 \cdot \int \frac{\sin 2\alpha}{\alpha} d\alpha = p_0 V_0 \cdot$



90−22,5°

$\int \frac{\sin 2\alpha}{2} d\alpha = \frac{1}{4} \int \sin 2\alpha\, d2\alpha =$

$= \frac{1}{4}(-\cos 2\alpha$

$\frac{p}{p_0} = R \cdot \sin\alpha$ $R = 1$

$\frac{V}{V_0} = R \cdot \cos\alpha$

$\frac{3}{2}\nu RT$

$p = p_0 \cdot \sin\alpha$

$V = V_0 \cdot \cos\alpha$

$Q = A + \Delta U \Leftrightarrow c \cdot dT = p \cdot dV + \frac{5}{2}\nu R\, dT \Leftrightarrow$

$p \cdot V = \nu RT \Leftrightarrow$

90, 0
−22, 5
67, 5

$p\,dV = -\frac{5}{2}\nu R \cdot dT$

$p = \frac{\nu RT}{V}$

$\Rightarrow \cancel{\nu R}T \cdot \frac{dV}{V} = \frac{5}{2}\cancel{\nu}R\,dT \Leftrightarrow$

$\int_{V_1}^{V} \frac{dV}{V} = \int_{T_1}^{T} dT \Leftrightarrow \ln|V - V_1| = T - T_1 \Leftrightarrow$

$T(V) = T_1 + \ln|V - V_1|$

$p = -\frac{5}{2}\nu R \cdot \frac{dT}{dV}$

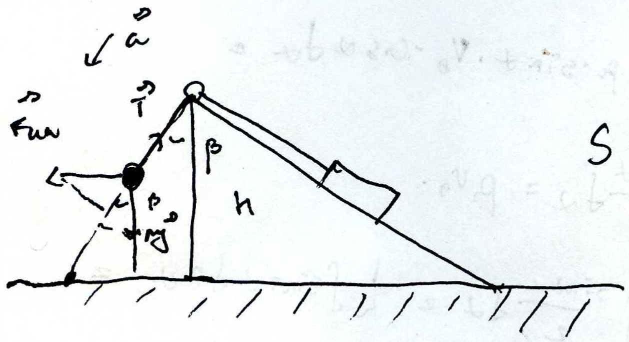
$\Rightarrow \frac{dT}{dV} = \frac{1}{V - V_1}$

$\Rightarrow p = -\frac{5}{2}\nu R \cdot \frac{1}{V - V_1} \Leftrightarrow$

$67 \cdot 2 =$

$= 134$

ЧЕРНОВИК



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

$$-T + mg\cdot\cos\beta + mA\cdot\sin\beta = ma_0 \Leftrightarrow$$

$$-\frac{mg}{\cos\beta} + mg\cdot\cos\beta + m\cdot\frac{5}{12}g\cdot\sin\beta = ma_0 \Leftrightarrow$$

$$-\frac{13}{12}g + \frac{12}{13}g + \frac{5}{12}\cdot\frac{5}{13}g = a_0 \Leftrightarrow$$

$$a_0 = g\left(\frac{1}{4} - \frac{13}{12} + \frac{12}{13}\right) = \left(\frac{3-13}{12} + \frac{12}{13}\right)\cdot g =$$

$$= \left(-\frac{10}{12} + \frac{12}{13}\right)\cdot g =$$

$$= -\frac{5}{6} + \frac{12}{13} = \frac{-65+72}{78} = \frac{7}{78}\cdot g$$

$$13 \cdot 6 = 78$$

$$\frac{at^2}{2} = \frac{13}{12}\cdot H \Leftrightarrow$$

$$13\cdot 78 = 6\cdot 13\cdot 13$$

$$at^2 = \frac{13}{6}H \Leftrightarrow t^2 = \frac{13}{6}H\cdot\frac{78}{7}\cdot\frac{1}{g} = \frac{6\cdot 13\cdot 13}{6\cdot 7}\cdot Hg \Leftrightarrow$$

$$t = 13\cdot\sqrt{\frac{H}{g7}}$$

$$t = 13\cdot\sqrt{\frac{H}{7g}}$$

$\cos\alpha \cdot \cos\beta = 2 -$

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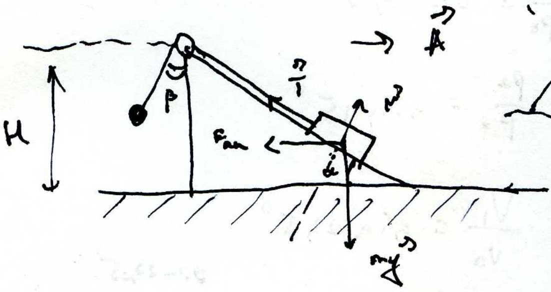
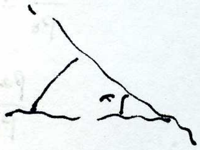
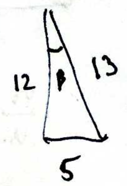
ЧЕРНОВИК

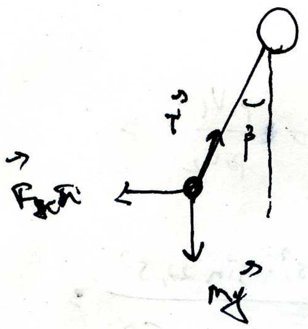




$\cos\beta = \frac{12}{13}$



$\Rightarrow$ $tg\,\beta = \frac{5}{12}$



"x" $T\cdot\sin\beta - mA = 0$

$\Leftrightarrow mA = T\cdot\sin\beta \Leftrightarrow$

$$A = \frac{T\cdot\sin\beta}{m} = \frac{mg\cdot tg\,\beta}{m} = g\cdot tg\,\beta =$$

$$= \frac{5}{12}\cdot g$$

$T\cdot\cos\beta - mg = 0 \Leftrightarrow$

$$T = \frac{mg}{\cos\beta}$$

II з-н: $\vec{T} + \vec{N} + m\vec{g} + \vec{F}_{ин} = m\vec{a}$

"x" $2ma = T + 2mA\cdot\cos\alpha - mg\sin\alpha \Leftrightarrow$

$$2ma = \frac{mg}{\cos\beta} + 2m\cdot\frac{5}{12}\cdot g\cdot\cos\alpha - mg\sin\alpha \Leftrightarrow$$

$$2a = \frac{13}{12}\cdot g + \frac{10}{12}g\cdot\frac{4}{5} - \frac{3}{5}g \Leftrightarrow$$

$$2a = g\left(\frac{13}{12} + \frac{2}{3} - \frac{3}{5}\right) = g\cdot\frac{13\cdot5 + 2\cdot20 - 3\cdot12}{60} =$$

$$= g\cdot\frac{65+40-36}{60} = g\cdot\frac{105-36}{60} =$$

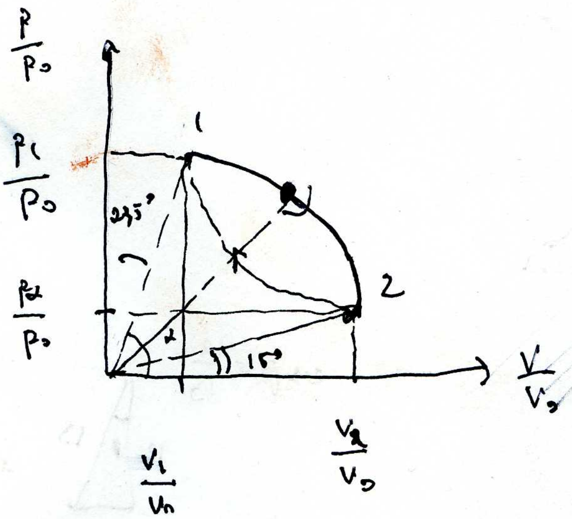
$$= g\cdot\frac{69}{60} = g\cdot\frac{23}{20}$$

$105 - 36 = 69$

$105 - 72 = 33$

$\frac{33}{120} = \frac{11}{60}$

черновик



$\frac{p_1}{p_0} = \cos 22,5^\circ$

$\frac{p_2}{p_0} = \sin 15^\circ$

$\frac{V_1}{V_0} = \sin 22,5^\circ$

$90 - 22,5$

$\frac{V_2}{V_0} = \cos 15^\circ$

$\frac{p_1V_1}{T_1} = \frac{p_2V_2}{T_2} \Rightarrow \quad \frac{T_1}{T_2} = \frac{p_1V_1}{p_2V_2} = \frac{\cos 22,5^\circ \cdot \sin 22,5^\circ}{\sin 15^\circ \cdot \cos 15^\circ} =$

$c = 0 \Rightarrow Q = 0$

$\Rightarrow$

$A = -\Delta U \Rightarrow$

$\int p\,dV = -\frac{5}{2}\nu RT$

$\frac{p}{p_0} = tg\,\alpha \cdot \frac{V}{V_0} \Rightarrow$

$p = \frac{p_0}{V_0} \cdot tg\,\alpha V \qquad A = \int p\,dV = \int$

$Q = A + \Delta U \Rightarrow$

$\int\limits_{0} c\,dT = \int p\,dV + \frac{3}{2}\nu R(T_2 - T_1) \Rightarrow$

$\int p\,dV = -\frac{3}{2}\nu R \cdot \Delta T \qquad \Delta T \to 0 \Rightarrow$

$-\frac{3}{2}\nu R\,dT = p\,dV$

$0 = \frac{p_0V_0}{4}(-\cos 2\alpha + \cos 135^\circ) + \frac{5}{2} p_0V_0 \cdot \frac{\sin 2\alpha}{2 \sin 135^\circ}$

$0 = p \cdot dV$

$\frac{3}{2}\nu R\left(T \cdot \frac{\sin 135^\circ}{\sin 2\alpha}\right)$

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ЧЕРНОВИК

$\nu R T = p_0 V_0 \cdot \frac{\sin 2\alpha}{2}$

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

$\nu R T_1 =$

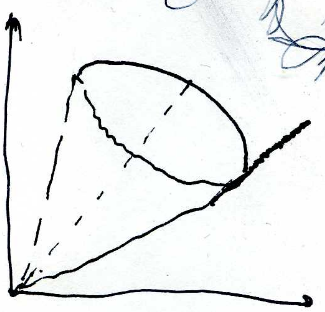
$\Rightarrow \frac{5}{2} \nu R T \left(\frac{\sin 2\alpha}{\sin 135^\circ} - 1 \right) = \frac{5 p_0 V_0}{4} \cdot \sin 2\alpha \left(\frac{\sin 2\alpha}{\sin 135^\circ} - 1 \right)$

$\frac{pV}{T} = \frac{p_1 V_1}{T_1} \Rightarrow$

$T = T_1 \cdot \frac{pV}{p_1 V_1} = T_1 \cdot \frac{\sin 135^\circ}{\sin 2\alpha} \Rightarrow T_1 = T \cdot \frac{\sin 2\alpha}{\sin 135^\circ}$

$Q = \frac{p_0 V_0}{4} (-\cos 2\alpha + \cos 135^\circ) + \frac{5 p_0 V_0}{4} \cdot \sin 2\alpha \left(\frac{\sin 2\alpha}{\sin 135^\circ} - 1 \right)$

$0 = -\cos 2\alpha + \cos 135^\circ + \frac{5 \sin^2 2\alpha}{\sin 135^\circ} - 5 \sin 2\alpha$



$0 = p \cdot dV + \frac{5}{2} \nu R\, dT$

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Часть 2

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

Шифр: **21201589**

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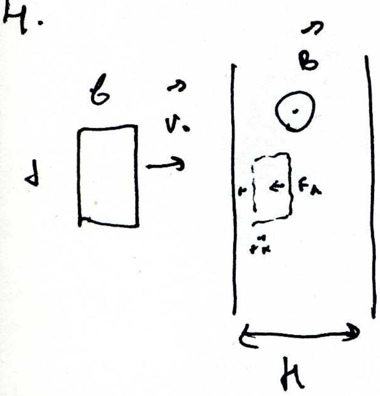
Вариант 6

ЧИСТОВИК   Вариант 11-06   1

4.



1.) $|\mathcal{E}_{инд}| = \left|\frac{d\varphi}{dt}\right| = \frac{dS\cdot B}{dt} = B\cdot d\cdot\frac{dx}{dt} =$

$= B\cdot d\cdot V_0$

$$I = \frac{|\mathcal{E}_{инд}|}{R} = \frac{d\cdot B\cdot V_0}{R}$$

II з.Н: $F_A = ma \Rightarrow a = \frac{F_A}{m} = \frac{I\cdot B\cdot d}{m} = \frac{d^2B^2V_0}{mR}$

2.) $m\cdot\frac{dv}{dt} = -d^2B^2\cdot V \Rightarrow \frac{dV}{V} = -\frac{d^2B^2}{m}\cdot dt \Rightarrow$

а.) $\Rightarrow \int\frac{dV}{V} = -\int\frac{d^2B^2}{m}dt \Rightarrow V(t) = V_0\cdot e^{-\frac{d^2B^2}{m}\cancel{t}}$

$$x(t) = \underset{0}{\underset{\shortparallel}{x_0}} + \frac{V_0 m}{d^2B^2}\cdot e^{-\frac{d^2B^2}{m}\cancel{t}_1} = \frac{d}{4} \Rightarrow$$

$$e^{-\frac{d^2B^2}{m}t_1} = \frac{d^3B^2}{4V_0m} \Rightarrow -\frac{d^2B^2}{m}t_1 = \ln\left|\frac{d^3B^2}{4V_0m}\right| \Rightarrow$$

$$\Rightarrow t_1 = \frac{\ln\left|\frac{d^3B^2}{4V_0m}\right| m}{d^2B^2}$$

$$\Rightarrow V_1' = \frac{V_0m}{d^2B^2}\cdot\frac{d^3B^2}{4V_0m} = \frac{V_0}{4}$$

аг2р

б.) ...... $t_{2..} = \frac{\ln\left|\frac{2}{7}\cdot\frac{d^3B^2}{V_0m}\right| m}{d^2B^2} \Rightarrow V_1 = \frac{V_0}{4}\cdot\frac{2}{7} = \frac{V_0}{14}$

в.) анал. $V_2 = \frac{V_0}{14\cdot4} = \frac{V_0}{56}$

ЧИСТОВИК ВАРИАНТ 11-06 2

<u>Ответ:</u> 1) $\frac{l^2 B^2 V_0}{mR}$ 2) $\frac{V_0}{14}$ 3) $\frac{V_0}{56}$

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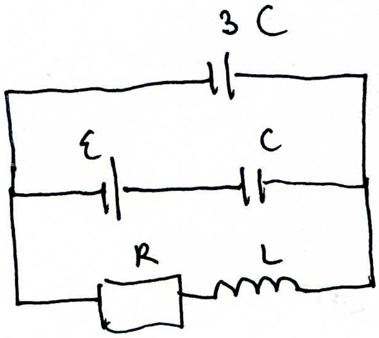
ЧИСТОВИК Вариант 11-06 3

3.

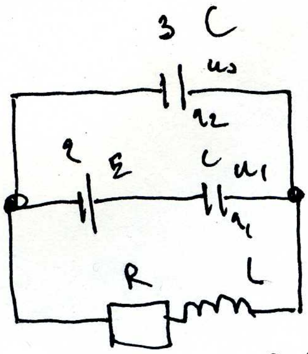


1) В н. момент тока нет и заряды ещё не перераспределились

$\Rightarrow U_L = E \Rightarrow L\frac{dI}{dt} = E \Rightarrow$

$\Rightarrow \frac{dI}{dt} = \frac{E}{L}$

2)



$E + U_1 = U_2$ $\quad U_1 = \frac{q_1}{C}$ $\quad U_2 = \frac{q_2}{3C}$

$\Rightarrow E + \frac{q_1}{C} = \frac{q_2}{3C} \Rightarrow 3EC + 3q_1 = q_2$

ЗСЗ: $q_1 + q_2 = 0 \Rightarrow q_1 + 3EC + 3q_1 = 0 \Rightarrow$

$4q_1 = -3EC \Rightarrow q_1 = -\frac{3EC}{4}$

$W_0 = 0$ (начальная энергия)

$\Rightarrow q_2 = \frac{3EC}{4} \Rightarrow U_1 = -\frac{3E}{4}$

$U_2 = \frac{3E}{4}$

$W_1 = \frac{CU_1^2}{2} + \frac{3CU_2^2}{2} =$

$= \frac{C}{2}\cdot\frac{9}{4}E^2 + \frac{3C}{2}\cdot\frac{9}{4}E^2 =$

$= CE^2\left(\frac{9}{4}\cdot\frac{1}{2} + \frac{9}{4}\cdot\frac{3}{2}\right) = CE^2\cdot\frac{9+27}{8} = \frac{36}{8}CE^2 = \frac{9}{2}CE^2$

$\Delta q\cdot E = A = \frac{6EC}{4}\cdot E = \frac{3CE^2}{2}$ $\quad$ ЗСЭ: $W_1 - W_0 = A + Q \Rightarrow$

$\Rightarrow Q = W_1 - A = \left(\frac{9}{2} - \frac{3}{2}\right)CE^2 = 3CE^2$

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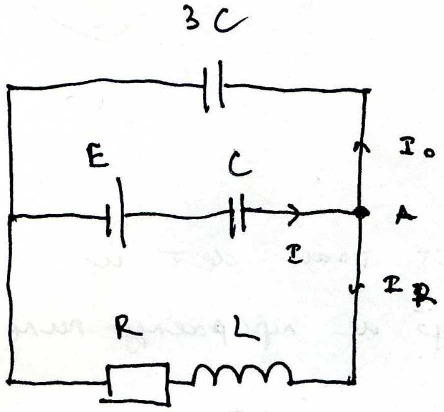
3.)



Ток общий:

$$I = \frac{E}{R}$$

$$(\cdot)\ A: \quad I = I_0 + I_R \iff$$

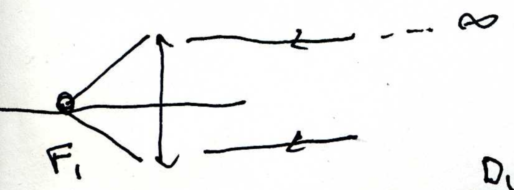
$$\iff \quad I_R = I - I_0$$

$$U_R = I_R \cdot R = R\left(\frac{E}{R} - I_0\right) = E - I_0 R$$

Ответ: 1.) $\frac{E}{L}$ 2.) $3CE^2$ 3.) $E - I_0 R$

ЧИСТОВИК Вариант 11-06 (5)

5\. 1.) Т.к. человек обладает нулевым пределом аккомодации, то фок. расстояние очков для дальних предметов совпадает с расст. до точки фокусировки



1 – для дальних предметов

2 – для 25 см.

$$\frac{D_1}{D_2} = \frac{7}{3} \qquad D_1 = 7D \;;\; D_2 = 3D$$

$$\left.\begin{array}{l} F_1 = \frac{1}{D_1} \\ F_2 = \frac{1}{D_2} \end{array}\right| \Rightarrow \frac{F_1}{F_2} = \frac{\frac{1}{D_1}}{\frac{1}{D_2}} = \frac{D_2}{D_1} = \frac{3}{7} \Rightarrow$$

$$F_1 = 3F \;;\; F_2 = 7F$$

для 25 см: $\frac{1}{d} + \frac{1}{f} = \frac{1}{F_2}$, $d = 25$, $f = 3F$ $\Leftrightarrow$ $\frac{1}{25} + \frac{1}{3F} = \frac{1}{7F}$ $\Leftrightarrow$

$$\frac{1}{25} = \frac{4F}{21F} \Leftrightarrow F = \frac{100}{21}$$

$$\Rightarrow F_1 = 3F = \frac{100}{7}\text{ см} = \frac{1}{7}\text{ м} \Leftrightarrow D_1 = 7\text{ дптр}$$

$$\Rightarrow x = \frac{1}{7}\text{ м}$$

2.) $$\frac{1}{50} + \frac{1}{3F} = \frac{1}{F_x} \Leftrightarrow \frac{1}{50} + \frac{7}{100} = \frac{1}{F_x} \Leftrightarrow$$

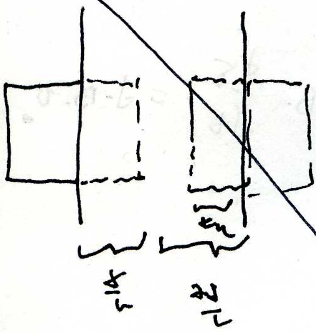
$$\frac{1}{F_x} = \frac{2+7}{100} \Leftrightarrow F_x = \frac{100}{9}\text{ см}$$

$$\Rightarrow D_x = 9\text{ дптр}$$

Ответ: 1.) $\frac{1}{7}$ м дптр 2.) 9 дптр

~~Черновик~~ ~~Вариант № 06~~

3.) ~~Черновик~~



$\frac{1}{4}d < x < \frac{7d}{4}$

$\frac{7d}{4} < x < 2d$

$v_1 = \dots$

$\frac{d}{4} = v_1 \cdot t - \frac{at^2}{2}$

$v_0 = v_1 - a \cdot t$

$\frac{at^2}{2} - v_1 t + \frac{d}{4} = 0$

$t = \frac{v_1 + \sqrt{v_1^2 - \frac{ad}{2}}}{a}$

$\Rightarrow |v_0| = \left| v_1 - v_1 - \sqrt{v_1^2 - \frac{ad}{2}} \right| =$

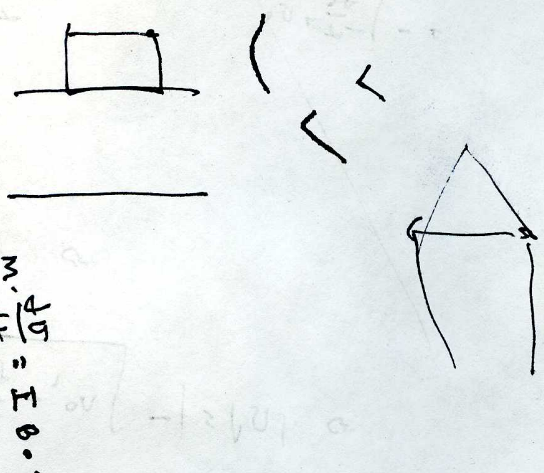
$= \sqrt{v_0^2 - \frac{7d^3 B^2 v_0}{mR}}$

Ответ: 1.) $\cancel{\frac{d^2B^2v_0}{mR}}$ 2.) $\cancel{\sqrt{v_0^2 - \frac{3d^3B^2v_0}{mR}}}$ 3.) $\cancel{\sqrt{v_0^2 - \frac{7d^3B^2v_1}{8mR}}}$

$m\frac{dv}{dt} = IB \cdot l = \frac{d^2B^2 \cdot v}{R}$

$m \frac{dv}{dt} = \frac{d^2 B^2}{R} v$

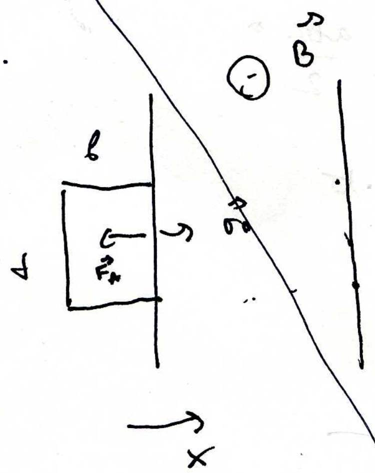
$v(t) = v_0 \cdot e^{-\frac{d^2B^2}{mR} \cdot t}$



черновик

~~Чистовик~~ ~~Вариант II 06~~ ~~I~~

4.



1) $|\mathcal{E}_{инд}| = \left|\frac{d\varphi}{dt}\right| = \frac{dS\cdot B}{dt} = d\cdot B\cdot\frac{dx}{dt} = d\cdot B\cdot v_0$

$$I = \frac{|\mathcal{E}_{инд}|}{R} = \frac{d\cdot B\cdot v_0}{R}$$

II з.Н: $ma = F_A \Rightarrow ma = I\cdot B\cdot d \Rightarrow$

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

2) сила действ. на пр. пока [illegible]

$x < \frac{d}{4}$

$$\begin{cases} \frac{d}{4} = v_0\cdot t - \frac{at^2}{2} \\ v' = v_0 - at \end{cases}$$

$\Rightarrow v' = v_0 - v_0 - \sqrt{\frac{da}{-2} + v_0^2} = -\sqrt{\frac{da}{-2} + v_0^2}$

$\frac{d}{4} < x < 2d$

$$\begin{cases} \frac{3}{4}d = v'\cdot t_1 - \frac{2at_1^2}{2} \\ v_1 = v' - 2at_1 \end{cases}$$

$2\cdot\frac{at_1^2}{2} + \sqrt{\frac{da}{-2} + v_0^2}\, t_1 + \frac{3}{4}d$

$\frac{at^2}{2} - v_0 t + \frac{d}{4} = 0$

$D = v_0^2 - \frac{da}{2} \Rightarrow$

$t = \frac{v_0 + \sqrt{\frac{da}{-2} + v_0^2}}{a}$

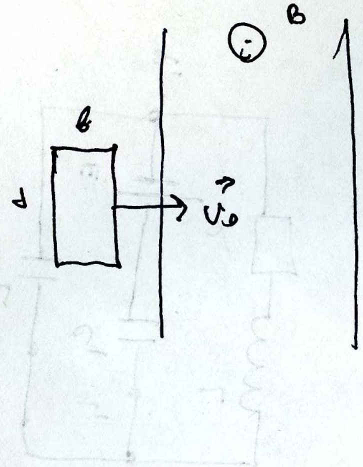
$D = \frac{da}{-2} + v_0^2 + \frac{3da}{2} = v_0^2 + 3da$

$\Rightarrow t_1 = \frac{\sqrt{v_0^2 - \frac{da}{2}} + \sqrt{v_0^2 + 3da}}{2a}$

$\Rightarrow |v| = \left| -\sqrt{v_0^2 - \frac{da}{2}} + \sqrt{v_0^2 - \frac{da}{2}} - \sqrt{v_0^2 + 3da} \right| = \sqrt{v_0^2 + \frac{3d^3B^2v_0}{mR}}$

$d, \quad b = \frac{d}{4} \quad R \quad B$

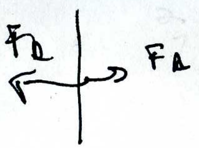
m, d, V_0, R, B



$\vec{B}$

$|\mathcal{E}_{ind}| = \frac{d\Phi}{dt} = \frac{d \cdot dx \cdot B}{dt} = d v_0 B$

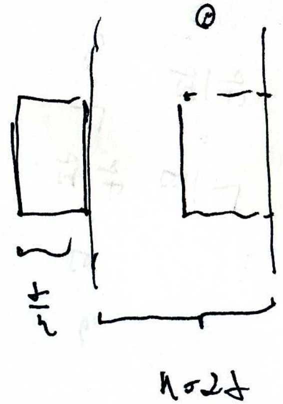
$I = \frac{\mathcal{E}_{ind}}{R} = \frac{d v_0 B}{R}$



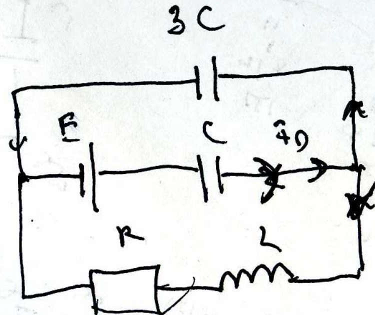
$I \cdot B \cdot d = ma$

1.) $a = \frac{I \cdot B \cdot d}{m} = \cancel{\frac{d^2 B^2 v}{mR}}$

$\cancel{S < \frac{d}{4}}$



2) $\frac{E}{R}$.



$\cancel{\mathcal{E}_R = \frac{E}{R} - 2I_0}$

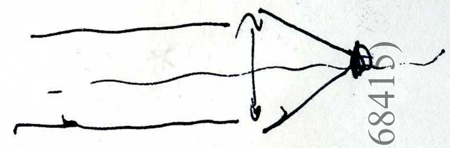
$U_R = E - I_0 R$

$I = \frac{E}{R}$

$D_1 + D_2 = 7D$

$F_2 = 7F$

$3F \quad D_0 + D_1$



$\frac{1}{25} + \frac{1}{7F} = \frac{1}{3F}$

$\frac{1}{25} = \frac{7F - 3F}{21F^2}$

$25 = \frac{21F}{4}$

$F = \frac{25 \cdot 4}{21} = \frac{100}{21}$ cm

$F_{ok} = \frac{300}{21}$ cm $= \frac{100}{7}$

$F_{ob} = \frac{100}{3}$ cm $D = 3$

$\frac{1}{x} + t$

T

$\frac{1}{d} + \frac{1}{f} = -\frac{1}{F_1}$

$\frac{1}{50} + \frac{1}{7F} = \frac{1}{F}$

25 cm

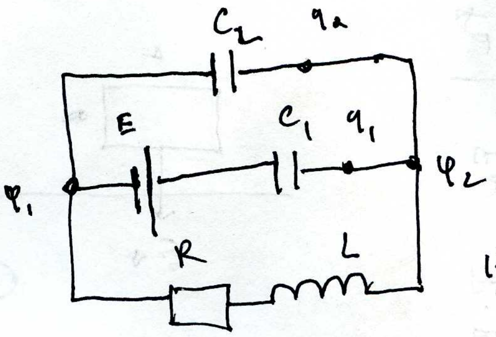
ЧЕРНОВИК

$C_1 = C$

$C_2 = 3C$

$\mathcal{E}, R$

L



1) $\varphi_2 = 0$ $\varphi_1 = E$

$\Rightarrow U_L = E \Leftrightarrow L\frac{dI}{dt} = E \Leftrightarrow$

$\Leftrightarrow \frac{dI}{dt} = \frac{E}{L}$

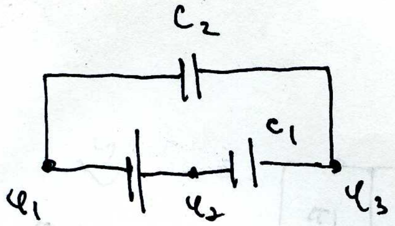
2) $U_2 = E$

$E + U_1 = U_2$

$q_2 + q_1 = 0 \Rightarrow$

$q_2 = C_2 \cdot E = 3CE$ $\quad W_0 = W$

$W = \frac{C_2 U_2^2}{2} + \frac{C_1 U_1^2}{2}$ $\quad A = \Delta q \cdot E$



$\varphi_1 - \varphi_2 = E$ $\quad U_1 = \frac{q_1}{C}$ $\quad q_1 + q_2 = 0 \Rightarrow$

$\varphi_1 - \varphi_3 = U_2$ $\quad U_2 = \frac{q_2}{3C}$ $\quad q_1 - 3EC - 3q_1 = 0 \Leftrightarrow$

$\varphi_2 - \varphi_3 = U_1$

$E + U_1 = U_2 \Leftrightarrow E + \frac{q_1}{C} = \frac{q_2}{3C} \Leftrightarrow 3EC = 2q_1 \Leftrightarrow$

$q = -\frac{3}{2}EC$

$q_2 = 3EC + 3q_1$

$\Rightarrow U_1 = -\frac{3}{2}E$

$q_2 = 3EC + \frac{9}{2}EC =$

$= \frac{6+9}{2}EC = \frac{15}{2}EC$

$\Rightarrow q_2 = \frac{5}{2}EC$

$\Rightarrow U_2 = \frac{5}{2}E$

$\Rightarrow W = \frac{3C}{2} \cdot \frac{25}{4}E^2 + \frac{C}{2} \cdot \frac{9}{4}E^2 =$

$= CE^2 \cdot \left(\frac{75}{8} + \frac{9}{8}\right) = CE^2 \cdot \frac{84}{8} =$

$= CE^2 \cdot \frac{4}{2}$

$Q = W + A$

A $\quad q_1 = -\frac{3}{2}EC \Rightarrow q_2 = -\frac{3}{2}EC$

$E + \frac{q_1}{C} = \frac{q_2}{3C} \Leftrightarrow$

q

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