Часть 1

Олимпиада: **Физика, 9 класс (1 часть)**

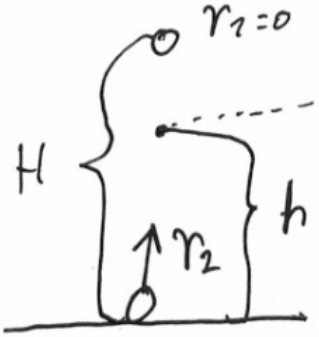
Шифр: **21205737**

ID профиля: **871336**

Вариант 1

Чистовик №2 | Задание 1

Дано:
τ; g
Найти:
H-?
h-?
$\frac{L_1}{L_2}$-?



$$\begin{cases} h = v_2\tau - \frac{g\tau^2}{2} \\ H-h = \frac{g\tau^2}{2} \end{cases} \Rightarrow H+h-h = v_2\tau - \frac{g\tau^2}{2} + \frac{g\tau^2}{2}$$

$$\boxed{H = v_2\tau} \qquad H = \frac{|v_{вл}^2 - v_2^2|}{2g} = \frac{v_2^2}{2g}$$

$$v_2\tau = \frac{v_2^2}{2g}\ ; \ \boxed{\tau = \frac{v_2}{2g}} \qquad \boxed{H = \frac{v_2^2}{2g}}$$

$$H-(H-h) = H - \frac{g\tau^2}{2} =$$

$$\begin{cases} H-h = \frac{g\tau^2}{2} \\ h = H-(H-h) \end{cases} \quad h = H-(H-h) = H - \frac{g\tau^2}{2} = \frac{v_2^2}{2g} - \frac{g\tau^2}{2}$$; подставим $\tau = \frac{v_2}{2g}$

$$h = \frac{v_2^2}{2g} - \frac{g}{2}\left(\frac{v_2}{2g}\right)^2 = \frac{v_2^2}{2g} - \frac{g\cdot v_2^2}{2\cdot 4g^2} = \frac{v_2^2}{2g} - \frac{v_2^2}{8g} = \frac{4v_2^2}{8g} - \frac{v_2^2}{8g} =$$

$$= \frac{3}{8}\frac{v_2^2}{g}\ ; \ \boxed{h = \frac{3}{8}\frac{v_2^2}{g}} \qquad \boxed{H = \frac{v_2^2}{2g} = \frac{1}{2}\frac{v_2^2}{g}}$$

$$\frac{H}{h} = \frac{\frac{1}{2}\frac{v_2^2}{g}}{\frac{3}{8}\frac{v_2^2}{g}}\ , \ \frac{1}{2}h = \frac{3}{8}H\ ; \ 4h = 3H\ ; \ \boxed{H = \frac{4}{3}h}$$

$$H-h = \frac{g\tau^2}{2} \quad = \frac{4}{3}h - h = \frac{1}{3}h = \boxed{\frac{1}{3}h = \frac{g\tau^2}{2}} \Rightarrow \boxed{h = \frac{3}{2}g\tau^2}$$

$$h = v_2\tau - \frac{g\tau^2}{2} \qquad H = \frac{4}{3}h = \frac{4\cdot 3}{3\cdot 2}g\tau^2 = 2g\tau^2\ ; \ \boxed{H = 2g\tau^2}$$

Пусть L_1 - путь 1-ого шара, а L_2 - второго.

Черновик

2) $h = H - \frac{gt^2}{2} = \frac{v_2^2}{2g} - \frac{g}{2}\left(\frac{v_2}{2g}\right)^2 = \frac{v_2^2}{2g} - \frac{g \cdot v_2^2}{2 \cdot 4g^2} = \frac{v_2^2}{8g} + \frac{2v_2^2}{2g}$

$\frac{4v_2^2 - v_2^2}{8g} = \frac{3v_2^2}{8g} = h$

$\frac{v_2^2}{2g} = H$

$\frac{H}{h} = \frac{\frac{3 \cdot v_2^2}{8 \cdot g}}{\frac{v_2^2}{2g}} = \frac{3}{4} \cdot \frac{2}{1} = \frac{6}{4} = \frac{3}{2}$

$\frac{3}{8}h = \frac{1}{2}H$

$3h = 4H$, $H = \frac{3}{4}h$

$h = \frac{v_2^2}{2g} - \frac{g}{2}\left(\frac{v_2^2}{4g^2}\right) = \frac{v_2^2}{2g} - \frac{v_2^2}{8g} = \frac{4v_2^2 - v_2^2}{8g} = \frac{3}{8}\frac{v_2^2}{g}$

$H = \frac{v_2^2}{2g} = \frac{1}{2}\frac{v_2^2}{g}$

$\frac{H}{h} = \frac{\frac{1}{2}\frac{v_2^2}{g}}{\frac{3}{8}\frac{v_2^2}{g}} = \frac{\frac{1}{2}}{\frac{3}{8}}$, $\frac{3}{8}H = \frac{1}{2}h$

$3H = 4h$

$H = \frac{4}{3}h$

$L_1 = H + H - h = \frac{8}{3}h - h = \frac{5}{3}h$

$L_2 = h$

$\frac{L_1}{L_2} = \frac{\frac{5}{3}}{1} = \frac{5}{3}$

$\frac{L_1}{L_2} = \frac{5}{3}$ (3)

$y_0 S = v_0 t + \frac{gt^2}{2} = v_0 t + \frac{(v_k - v_0) \cdot t^2}{2t} =$

$a = \frac{v_2 - v_1}{t} = \frac{v_k - v_0}{t}$

$= v_0 t + \frac{(v_k - v_0)}{2} t = t\left(v_0 + \frac{v_k - v_0}{2}\right)$

$H - h = \frac{gt^2}{2}$

$\frac{1}{3}h = \frac{gt^2}{2}$

$v_2 - ?$

$h = v_2 t - \frac{gt^2}{2}$

$h = v_2 t - \frac{1}{3}h$

$\frac{4}{3}h = v_2 t$

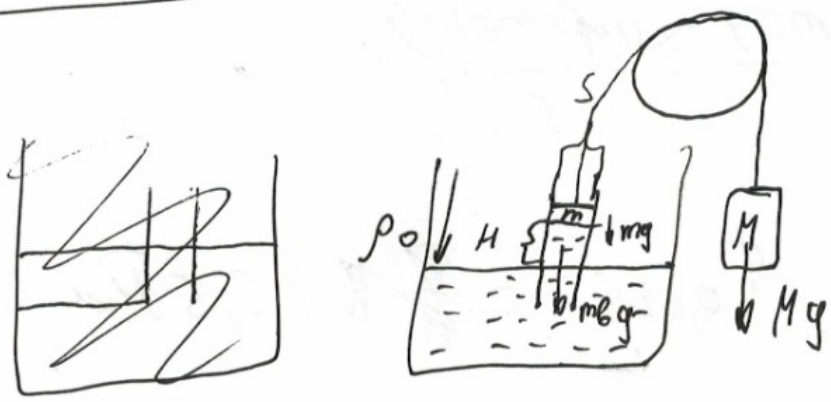
$h = \frac{3v_2 t}{4}$

Черновик: $H - h = \frac{1}{3}h = \frac{g\tau^2}{2}$; $h = \frac{3g\tau^2}{2} = 1{,}5\,g\tau^2$ V

$H = \frac{4}{3}h = \frac{4}{3}\cdot\frac{3}{2}g\tau^2 = 2g\tau^2$ V

Ответ: 1) $H = 2g\tau^2$ 2) $h = 1{,}5g\tau^2$ 3) $\frac{L_1}{L_2} = \frac{5}{3}$

(2)

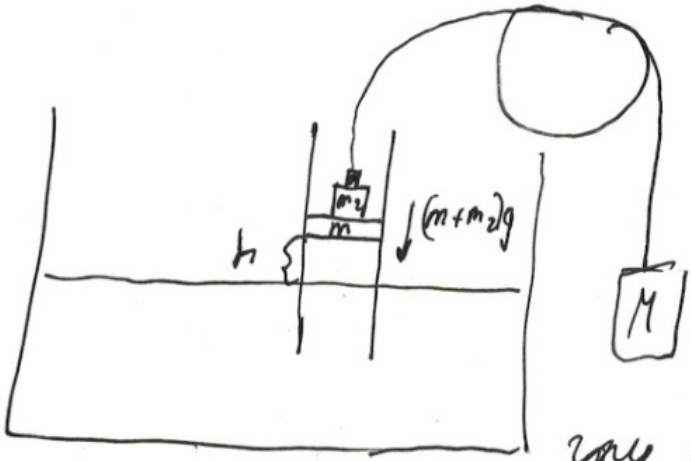


$M_g = mg + m_в g$; $M = m + m_в$; $M = 50г + \rho_в \cdot V_в =$

$= 50г + 1\frac{г}{см^3} \cdot 8см^2 \cdot 10см = \frac{80см^3 \cdot г}{см^3} + 50г = 130г.$

$M = 130$ г. 2) Если система находится в равновесии, значит p под поршнем = p на воду в открытой части сосуда $\Rightarrow p_п = p_0 = 100$ кПа

50 + 120 130 1)



170 - 130

40г. | 0г

Груз поршень станет действовать с силой $F = 0{,}04\,кг \cdot 10 = 0{,}4\,Н$ $F = 0{,}4$ Н

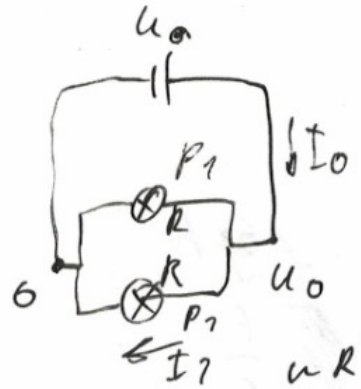
Чистовик №2 *Задание 1

$$\frac{L_1}{L_2} = \frac{H+(H-h)}{h} = \frac{\frac{4}{3}h + \frac{1}{3}h}{h} = \frac{\frac{5}{3}*}{*} = \frac{5}{3}; \quad \boxed{\frac{L_1}{L_2} = \frac{5}{3}}$$

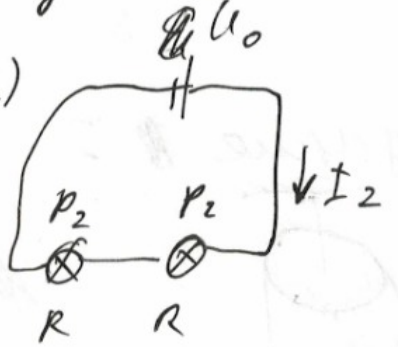
Ответ: 1) $H = \boxed{2gt^2}$ 2) $h = \boxed{7{,}5gt^2}$ 3) $\frac{L_1}{L_2} = \boxed{\frac{5}{3}}$

Задание 3

1)



2)



Дано:
$U_0 = 72$ В
$P_1 = 20$ Вт
$P_2 = 6{,}6$ Вт

Найти:
I_1 - ? I_2 - ?
P_3 - ?

* в 1-ой схеме ток в обоих лампах равены т.к. мощности равны

• 1 для 1-ой схемы $R_{общ_1}$ - ?

$$\frac{1}{R_{общ_1}} = \frac{1}{R} \cdot 2 = \frac{2}{R}; \quad \boxed{R_{общ_1} = \frac{1}{2}R}$$

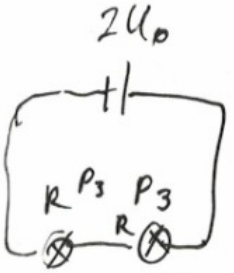
$$I_0 = \frac{U_0}{R_{общ_1}} = \frac{U_0}{0{,}5R}$$; U на лампе в 1-ой схеме $= U_0 \Rightarrow$

$$\Rightarrow P_1 = U_1 \cdot I_1 = U_0 \cdot I_1; \; 20 = 72 \cdot I_1; \quad \boxed{I_1 = \frac{20}{72} = \frac{5}{3}\,A}$$

$$I_2 = \frac{U_0}{R_{общ\,2}}; \quad R_{общ\,2} = R + R; \quad \boxed{I_2 = \frac{U_0}{2R}}; \quad \boxed{I_1 = \frac{U_0}{R}}$$

$$\frac{I_2}{I_1} = \frac{1}{2} \Rightarrow 2I_2 = I_1 = \frac{5}{3}\,A; \quad \boxed{I_2 = \frac{5}{6}\,A}$$

• 2

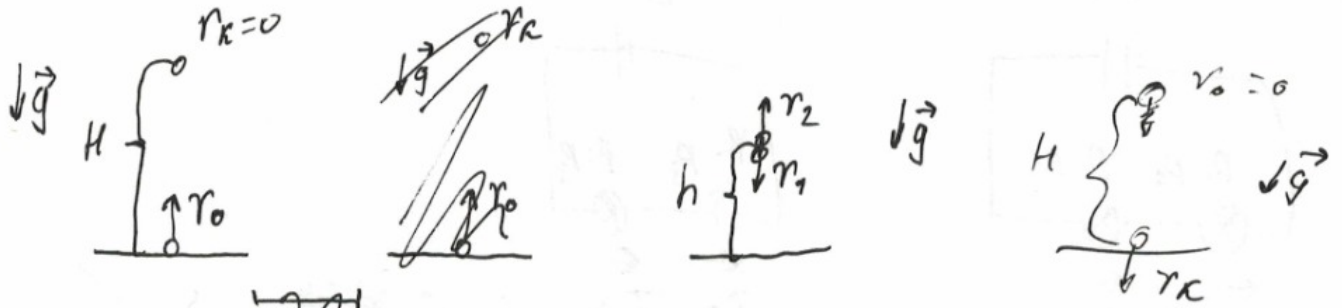


$$\begin{cases} P_3 = U_3 \cdot I_3 = I_3^2 \cdot R \\ P_2 = U_2 \cdot I_2 = I_2^2 \cdot R \end{cases}$$

$R_{общ\,3} = 2R$; $I_3 = \frac{2U_0}{2R} = \frac{U_0}{R}$; $I_2 = \frac{U_0}{2R}$ $\Rightarrow \frac{I_3}{I_2} = \frac{2}{1}$ I_3

Черновик | 1.1

① через T



$$S = \frac{v_к^2 - v_0^2}{2a}; \quad H = \frac{v_0^2}{2g}$$

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

$$2S = 2v_0 t + at^2$$

$$H = \frac{at^2}{2} \quad (v_0 = 0) = \frac{gt^2}{2} = H$$

$$\frac{v_0^2}{2g} = \frac{gt^2}{2} \qquad g^2t^2 = v_0^2$$

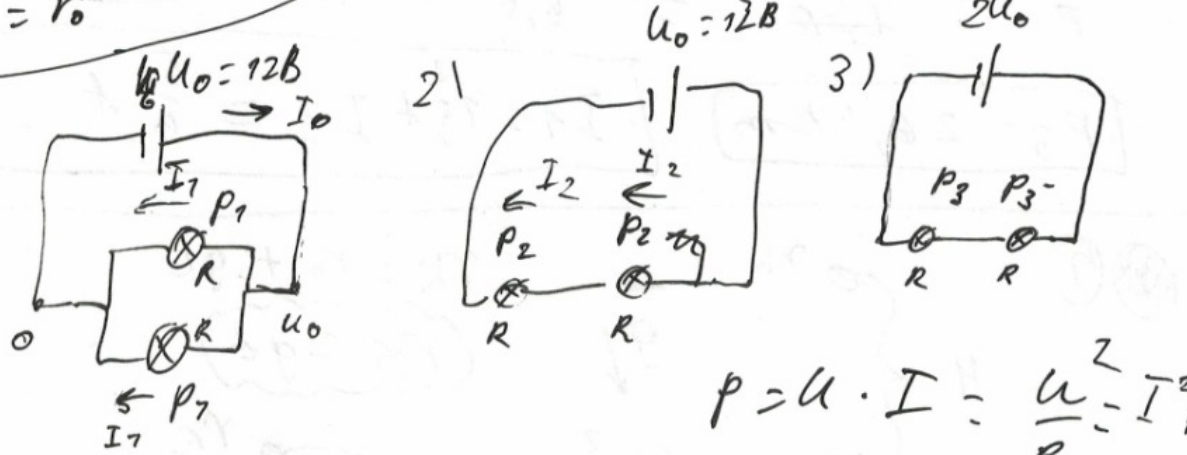
$$gt = v_0$$

$p_1 = 20$ Вт I_1 - ?

$p_2 = 6{,}6$ Вт I_2 - ?

P_3 - ?

③



$$P = U \cdot I = \frac{U}{R} = I^2 R$$

Возьмём сопротивл. одного R $I = \frac{U}{R}$ $U = IR$

1) $I_1 \cdot R = U_0$; $I_1 = \frac{U_0}{R}$

$\frac{1}{R_{общ_1}} = \frac{1}{R} + \frac{1}{R} = \frac{2}{R}$

$2R_{общ_1} = R$; $R_{общ_1} = \frac{R}{2}$

$I_0 = \frac{U_0}{0{,}5R}$ $I_0 = 2I_1$

$P_1 = UI = I_1 \cdot U_0$

$20 = I_1 \cdot 12$

$I_1 = \frac{20}{12} = \frac{5}{3} = 1\frac{2}{3}$ А

2)

$I_2 = \frac{U_0}{2R} \Rightarrow \frac{I_1}{I_2} = \frac{\frac{U_0}{R}}{\frac{U_0}{2R}} = \frac{1}{\frac{1}{2}} = \frac{2}{1}$

$2I_2 = I_1$

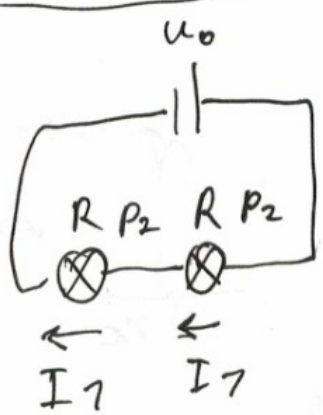
$I_2 = 0{,}5 I_1 = \frac{5}{3} \cdot 2 = \frac{5}{6}$ А

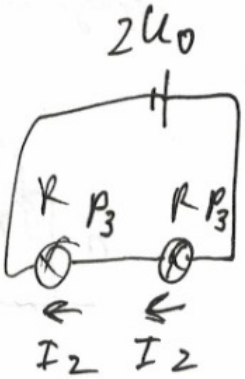
$\frac{U_0}{0{,}5R} = \frac{2U_0}{R}$; ~~$U_0 R = U_0 R$~~

~~$I_2 = 1{,}2$ А~~

$= \frac{5}{6}$ А $= I_2$

Черновик





$U = IR$

$P_2 = U \cdot I = I_1^2 R$

$I_2 = \frac{2U_0}{2R}$

$I_1 = \frac{U_0}{2R}$ $\Big\}$ $I_2 = 2I_1$

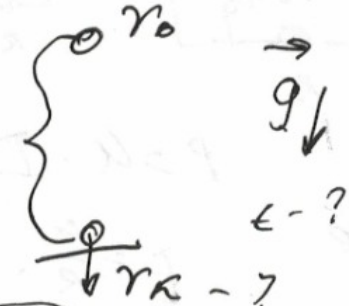
$P_2 = I_1^2 R$ $\quad P_3 = I_2^2 R$

$P_2 = I_1^2 R \quad P_3 = (2I_1)^2 R$

$\frac{P_3}{P_2} = \frac{4I_1^2 R}{I_1^2 R} = 4 = \frac{P_3}{6{,}6}$; $P_3 = 4 \cdot 6{,}6 = 26{,}4$ Вт

$P_3 = 26{,}4$ Вт $\quad I_1 = \frac{1}{3} A \; I_2 = \frac{5}{6} A$

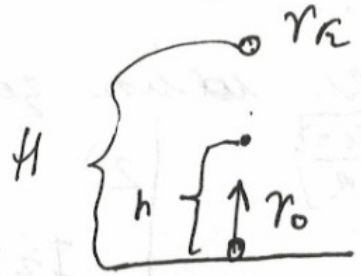
№ 7



$v_к = v_0 + g\epsilon$

$v_к = g\epsilon$

$H = \frac{g\epsilon^2}{2}$



$\begin{cases} h = v_0 \cdot \tau - \frac{g\tau^2}{2} \\ H - h = \frac{g\tau^2}{2} \end{cases}$

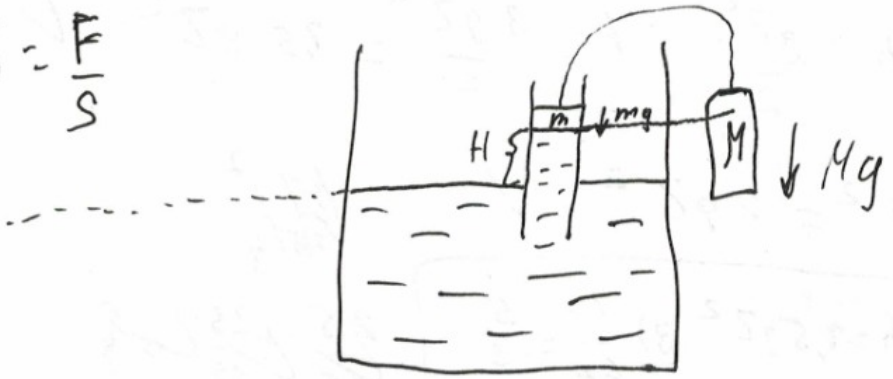
$h + H - h = v_0\tau - \frac{g\tau^2}{2} + \frac{g\tau^2}{2}$

$H = v_0\tau$

$v_0 = v_к$

Черновик

$\vec{p} = \frac{F}{S}$

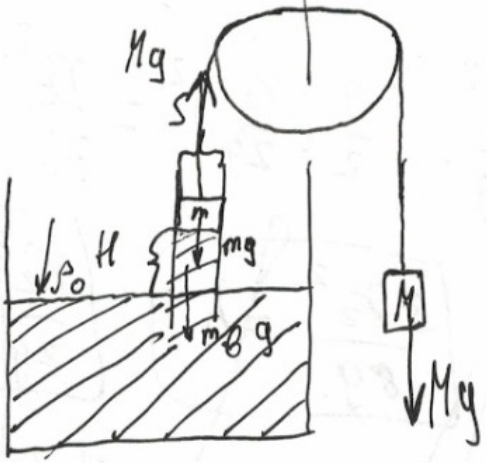


$p_б = p_т + \frac{mg}{S} + \frac{mBg}{S} = \frac{(mg + mB) \cdot g}{S}$

$\frac{mg}{0,08} = 0,625 = 62,5$ Па

Черновик

(2)



$S = 8 см^2$

$m = 50г =$

$H = 10 см$

$p_0 = 100 кПа$

$\rho = 1000 \frac{кг}{м^3} = \frac{г}{см^3}$

$g = 10 \frac{м}{с^2}$

$V_в = H \cdot S = 10 см \cdot 8 см^2 = 80 см^3$

$m_в = \frac{г}{см^3} \cdot 80 см^3 = 80 г$ $\boxed{m_в = 80г}$

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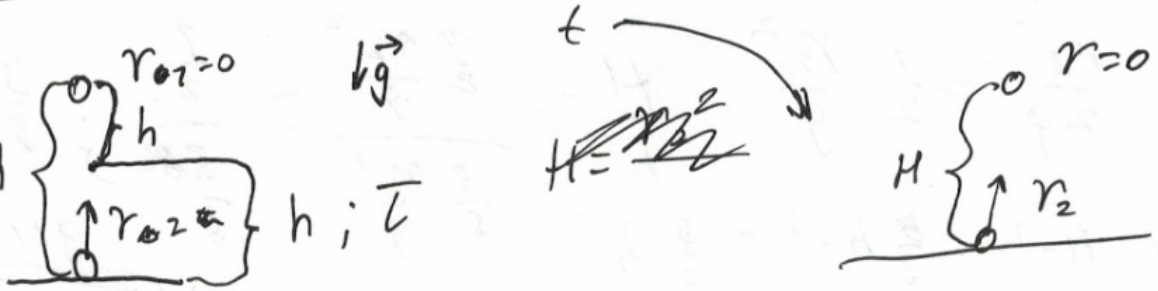
(1)



1) $\begin{cases} h = v_2 t - \frac{g t^2}{2} \\ H - h = \frac{g t^2}{2} \end{cases} \Rightarrow \boxed{H = v_2 t}$

$H = v_2 t - \frac{g t^2}{2} = \frac{v_2^2}{2g}$

$\boxed{t = \frac{v_2}{2g}}$

$t = \frac{v_2}{g}$

$h = \frac{v_2^2}{2g} - \frac{g \cdot t^2}{2} = h = \frac{v_2^2}{2g} - \frac{v_2^2}{4g} = \frac{v_2^2}{2g} - \frac{v_2^2}{4g} =$

$= \frac{2v_2^2 - v_2^2}{4g} = \boxed{\frac{v_2^2}{4g} = h}$ $\boxed{H = \frac{v_2^2}{2g}}$ $\frac{H}{h} = \frac{2}{1}$

$\boxed{2h = H} \Rightarrow$

2) $\Rightarrow$ ответ 3 $\frac{L_1}{L_2} = \frac{3h}{h} = 3$ $h = H - \frac{g t^2}{2} = \frac{v_2^2}{2g} - \frac{g}{2}\left(\frac{v_2}{2g}\right.$

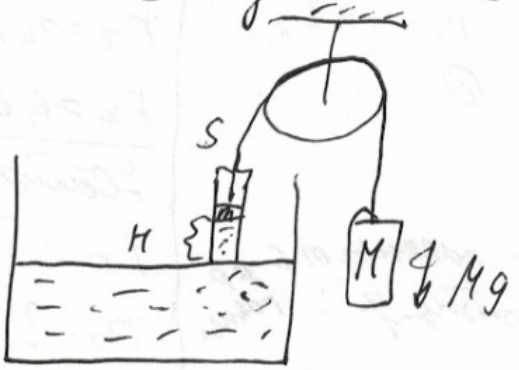
Чистовик № 3

$I_3 = 2I_2$; $\frac{P_3}{P_2} = \frac{I_3^2 \cdot R}{I_2^2 R} = \frac{I_3^2}{I_2^2} = \frac{(2I_2)^2}{I_2^2} = \frac{4I_2^2}{I_2^2} = 4$

$P_3 = 4P_2 = 4 \cdot 6{,}6 = 26{,}4$ Вт

Ответ: 1) $1\frac{2}{3}$ А 2) $\frac{5}{6}$ А 3) 26,4 Вт

Задание № 2



$p = \rho g h$

$p = \frac{F}{S}$

$p_0 = p_0 + \frac{mg + m_в g - Mg}{S}$ =>

$+p_0$ => $m + m_в = M$

1) Давление под поршнем $= \rho g H = 1000 \cdot 10 \cdot 0{,}1 =$

$= 1000$ Па $+ 100$ кПа $= 101$ кПа

2) поршень „вытягивает" $8 \cdot 10 = 80$ см^3 воды =>

=> 80 г ($\rho = 1$ г/см3); т.к. сист. в равновесии:

$(m_в + m)g = Mg$; $80 + 50 = M$; $M = 730$ г.

$m + m_в$

Ответ: 1) 101 кПа; 2) 730 г.

Часть 2

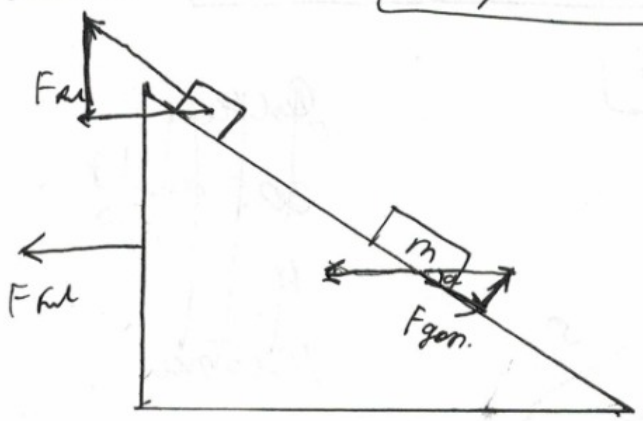
Олимпиада: **Физика, 9 класс (2 часть)**

Шифр: **21205737**

ID профиля: **871336**

Вариант 1

Черновик



$$\frac{F_{gon}}{F_{кл}} = \frac{4}{5} \Rightarrow F_{gon} = \frac{4}{5} F_{кл} \cos\alpha = \frac{4}{5} \cdot \frac{72}{25} mg$$

$$F_{gon} = \frac{48}{125} mg$$

$$m a_{gon} = \frac{48}{125} mg \quad ; \quad a_{gon} = \frac{48}{125} g$$

$$a_{сум} = a_{gon} + a_{ш} = \frac{48}{125} g + \frac{3}{5} g = \left(\frac{48}{125} + \frac{75}{125}\right) g =$$

$$= \frac{100 + 23}{125} = \frac{123}{125} g$$

$$S = \frac{a_{сум} t^2}{2} \quad ; \quad \frac{5}{3} H = \frac{123}{125} \cdot \frac{0{,}984 t^2}{2}$$

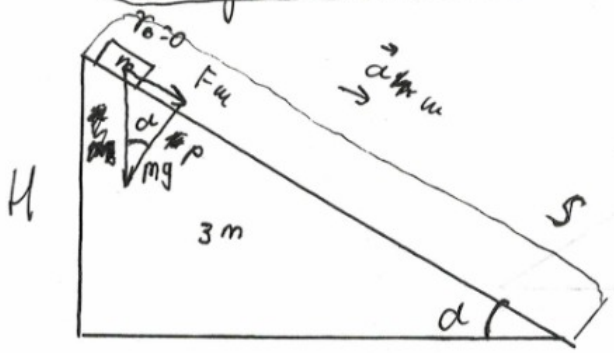
$$t = \sqrt{\frac{5 H \cdot 2}{3 \cdot 0{,}984 g}} = \sqrt{\frac{5 \cdot 125 \cdot H \cdot 2}{3 \cdot 123 g}} = \frac{25}{3}\sqrt{\frac{2H}{41g}}$$

$3 \cdot 41$

Чистовик №4 | Вариант 09-01

Задание №4

1)



Дано:
$\cos\alpha = \frac{4}{5}$
H
Найти

Из подобия треуг.:

$\frac{P}{mg} = \cos\alpha = \frac{4}{5}$; $P = \frac{4}{5}mg$; $F_м = \sqrt{m^2g^2 - P^2} = \sqrt{m^2g^2 - \frac{16}{25}m^2g^2} =$

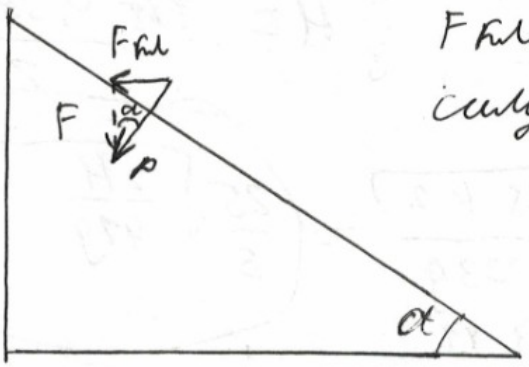
$= \frac{3}{5}mg$; $m \cdot a_м = \frac{3}{5}mg$; $\boxed{a_м = \frac{3}{5}g} \Rightarrow \sin\alpha = \frac{3}{5}$

$v_0 = 0$; $S = \frac{at^2}{2}$; $\frac{H}{S} = \sin\alpha = \frac{3}{5}$; $\boxed{S = \frac{5}{3}H}$

$\frac{5}{3}H = \frac{at^2}{2} = \frac{0,6t^2}{2} = 0,3t^2 = \frac{3}{10}gt^2$ $\quad / \cdot 30$

$50H = 9t^2$; $t = \sqrt{\frac{50H}{9 \cdot g}} = \boxed{\frac{5}{3}\sqrt{\frac{2H}{g}} = t}$

2)



$F_{тл}$ – проекция P, которая обозн. силу вдоль поверхности.

Ответ: 1) $\frac{5}{3}\sqrt{\frac{2H}{g}}$ 2) $0,16g$

$\frac{F_{тл}}{P} = \frac{3}{5} = \sin\alpha$ (из подобия) ; $P = \frac{4}{5}mg$

$5F_{тл} = \frac{3 \cdot 4}{5}mg$; $F_{тл} = \frac{12}{25}mg$; $a_{тл} = \frac{12}{25}g$

$a_{тл} = \frac{4}{25}mg = 0,16mg$

$\boxed{a = 0,16mg}$

Ответ: 1) $\frac{5}{3}\sqrt{\frac{2H}{g}}$ 2) $0,16 \cdot g$

Чистовик №5 | Вар 09-01 | Задача 5

1)

$V_{бака} = \pi H^2 \cdot H = \pi H^3 k$

k – площадь-кость шлюза: $S \cdot v = S \cdot \sqrt{0{,}5gH}$

$V = t \cdot k S \cdot \sqrt{0{,}5gH}$

$t = \dfrac{k \pi H^3}{S \cdot \sqrt{0{,}5gH}}$

$v_{ск} = \dfrac{H}{t}$

$v_x = \sqrt{v^2 - v_y^2}$

$v_{ск} = \sqrt{0{,}5gH - v_y^2}$

2)

$\begin{cases} H = v_{0x} \cdot t \\ H = \dfrac{gt^2}{2} - v_y t \end{cases}$

$v_{ск} = \dfrac{gt}{2} - v_y$

$\dfrac{H}{t} = \dfrac{gt}{2} - v_y \Rightarrow$

$H = \sqrt{0{,}5gH - v_y^2} \cdot t = \dfrac{gt^2}{2} - v_y t$

$\left(\sqrt{0{,}5gH - v_y^2}\right)^2 = \left(\dfrac{gt}{2} - v_y\right)^2$

$0{,}5gH - v_y^2 = \dfrac{g^2 t^2}{4} - v_y^2$

$0{,}5gH = \dfrac{g^2 t^2}{4}$; $\dfrac{1}{2}H = \dfrac{gt^2}{4}$

$H = \dfrac{gt^2}{2}$

$v_{ск} = \dfrac{gt}{2} - v_y$

$\dfrac{gt^2}{2} = \dfrac{gt^2}{2} - v_y t$

$0 = -v_y t \Rightarrow$

$\Rightarrow v_y = 0$

(т.к. $t > 0$)

если $v_y = 0$, то

$v_{ск} = v = \sqrt{0{,}5gH}$, а

$\angle \alpha = 0°$

Ответ: 1) $k \dfrac{\pi H^3}{S \cdot \sqrt{0{,}5gH}}$

2) $\angle \alpha = 0°$ 3) от 0 до 1

если $\alpha = 0°$: $\alpha = 0$ VVV подсоединит.

$t = \sqrt{\frac{2H}{g}}$; $v_y = v = \sqrt{\frac{Hg}{2}}$

$H = v \cdot t = \sqrt{\frac{2H \cdot H \cdot g}{2 \cdot g}} = H$

$$\begin{cases} H = \frac{gt^2}{2} - v_{0x} t \\ H = v_y \cdot t \end{cases}$$

$\frac{gt^2}{2} - v_{0x} t = v_y t$

$\frac{gt}{2} - v_{0x} = v_y = \frac{H}{t}$

$v = \sqrt{v_x^2 + v_y^2} = \sqrt{\frac{v_{0x}}{2} + \left(\frac{gt}{2} - v_{0x}\right)^2} = \sqrt{\frac{v_{0x}}{2} + \frac{g^2t^2}{4} - gt v_{0x} + v_{0x}^2} =$

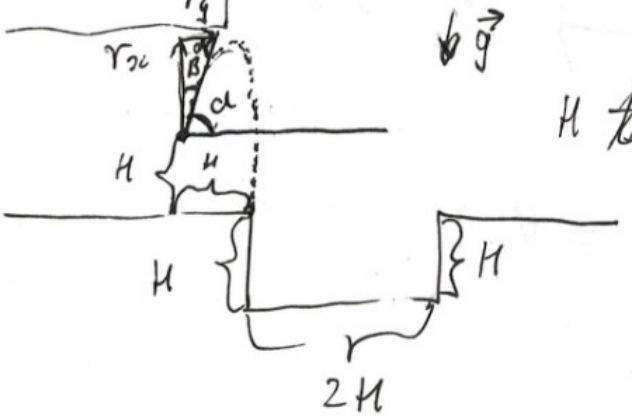
3) $\begin{cases} v_{0y} \cdot 3H = \tau \cdot v_y \\ H = \frac{g\tau^2}{2} - v_{0x}\tau \quad / \cdot 3; \quad 3H = \frac{3g\tau^2}{2} - 3v_{0x} \end{cases}$

$3\frac{g\tau^2}{2} - 3v_{0x}\tau = \tau \cdot v_y$

$3\frac{g\tau}{2} - 3v_{0x} = v_y$

Черновик

⑤



$\alpha - ?$

$\vec{g}$

$v = \sqrt{0{,}5gH}$

$H = \frac{gt^2}{2}$; $t^2 = \frac{2H}{g}$; $t = \sqrt{\frac{2H}{g}}$

$\angle\alpha = 0$????

$\sin\alpha = \frac{v_{3c}}{v}$ $\cos\alpha = \frac{v_y}{v}$ $\boxed{tg\angle\alpha = \frac{v_{3c}}{v_y}}$

$\begin{cases} H = v_y \cdot t \\ +H = -v_{3c} \cdot t + \frac{gt^2}{2} \end{cases}$

$-v_{3c}t = \frac{gt^2}{2} - H$

$v_{3c}t = H - \frac{gt^2}{2}$

$\boxed{v_{3c} = \frac{H - \frac{gt^2}{2}}{t}}$

$v_y \cdot tg\angle\alpha = v_{3c}$

$v_y = \frac{v_{3c}}{tg\angle\alpha}$

$v_y \cdot t = \frac{gt^2}{2} - v_{3c}t$

$v_y = \frac{H}{t}$ $v_{3c} =$!!!???

$v_y = \frac{gt}{2} - v_{3c}$

$\frac{gt^2}{2} = -v_{3c} \cdot t + \frac{gt^2}{2}$; $\boxed{-v_{3c}t = 0}$

$v_{3c} = 0$??? !!!

$\frac{H}{t} = \frac{gt}{2} - v_{3c}$; $\frac{H}{t} = \frac{gt}{2} - \left(H - \frac{gt^2}{2}\right) / \cdot t$

$H = \frac{gt^2}{2} - H + \frac{gt^2}{2}$ $2H = 2\frac{gt^2}{2}$

$2H = 2\frac{gt^2}{2} = gt^2$

$\boxed{H = \frac{gt^2}{2}}$

$\frac{gt^2}{2} = v_y \cdot t$; $\boxed{v_y = \frac{gt}{2}}$

Проверим

$v_y = \sqrt{0{,}5gH}$

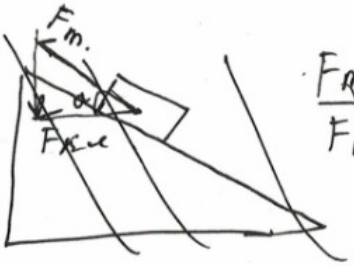
$H = \frac{gt^2}{2}$

$t = \sqrt{\frac{2H}{g}}$

$H = v_y \cdot t = \sqrt{\frac{2H}{g}} \cdot \sqrt{\frac{gH}{2}}$

$= \sqrt{\frac{2H \cdot H \cdot g}{g \cdot 2}} = H$

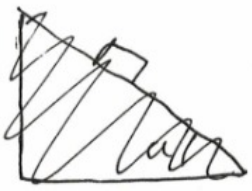
Задача № 4 Вар: 09-07



$\frac{F_m}{F_{A\ell}} = \frac{1}{\cos\alpha} = \frac{5}{4}$; $F_m = \frac{5}{4} F_{A\ell}$

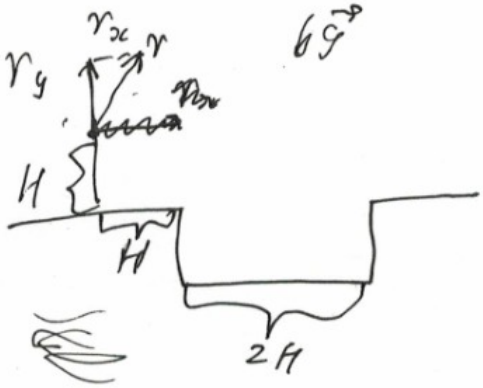
$= \frac{5}{4} \cdot \frac{3}{5} mg = \frac{3}{4} mg$

Чернова



t_y

Задача № 5



t - время полёта струи

2) $H = v_{0x} \cdot t$ $\quad v_0 = ?$

$H = \frac{gt^2}{2} - v_y t$ $\quad 1$

$1 = 1$

$v_{0x} \cdot t = \frac{gt^2}{2} - v_y t$

$v_{0x} = \frac{gt}{2} - v_y$ $\quad v_y = \frac{gt^2}{2} - v_{0x}$ $\quad v_{0x} = \frac{H - \frac{gt^2}{2}}{t}$

$-v_{0x} t = H - \frac{gt^2}{2}$

$v_{0x} = \frac{-H + \frac{gt^2}{2}}{t}$ $\quad \frac{H}{t} =$

τ

1) $V = v \cdot \tau \cdot S = \sqrt{0{,}5gH} \cdot \tau \cdot S$

$V = \pi H^2 \cdot H = \pi H^3$

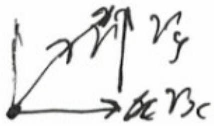
$\pi H^3 = \sqrt{0{,}5gH} \cdot \tau \cdot S$

$\tau = \frac{\pi H^3}{S \cdot \sqrt{0{,}5gH}}$

Чи ~~Чистовик №~~ Черновик

~~$1+tg^2\alpha = \frac{1}{\cos^2\alpha}$~~

~~$0+tg^2 0 = \frac{1}{\cos^2 0}$~~ ;

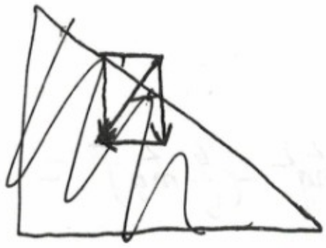


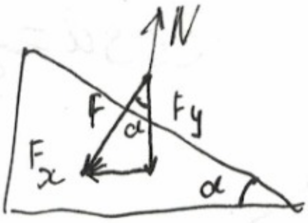
3) $\begin{cases} 3H = v_x \cdot T \\ H = \frac{gT^2}{2} - v_y \end{cases}$

значит [illegible]

21205737 (U871336 M1279644)

Черновик





$\frac{F_x}{F} = \frac{3}{5} = \sin\alpha$; $3F = 5F_x$

$F_x = \frac{3}{5}F = \frac{3}{5}\cdot\left(\frac{4}{5}mg\right) = \frac{12}{25}mg$

$F_x = \frac{12}{25}mg$

(2) $a_{кл} = \frac{4}{25}g$ $= 0{,}16g = a_{кл}$

$3m\,a_{кл} = \frac{12}{25}mg$

$3a_{кл} = \frac{12}{25}g$

$a_{кл} = \frac{12}{25\cdot 3}g = \frac{4}{25}g$

3 – ?

---

(5) $v = \sqrt{0{,}5gH} = \sqrt{\frac{gH}{2}}$ –

$V_{бака} = \pi R^2 \cdot H = \pi H^2 \cdot H = \pi H^3 = V_б.$

$R = H$

– ~~Сколько~~ длина воды через сопло за единицу t

V за ед. t = $S\cdot v = V$

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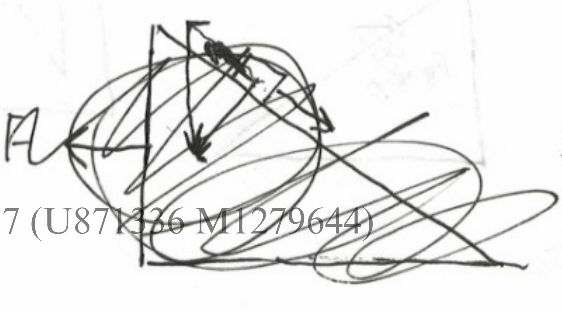
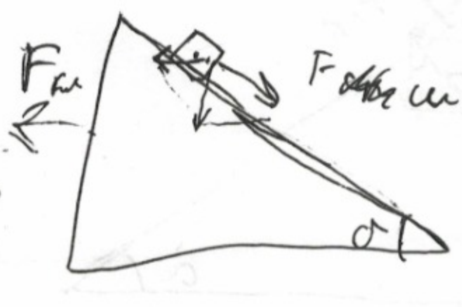
(4). (3)

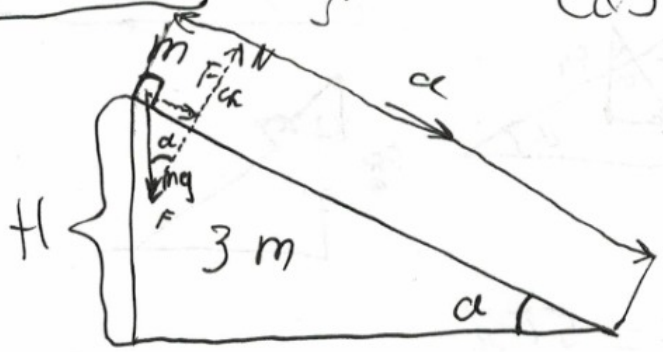




Черновик

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

(4)



$F_{ск} = mg^2 - \left(\frac{4}{5}mg\right)^2 =$

$= mg^2 - \frac{16}{25}mg^2 = \frac{9}{25}mg^2$

$\boxed{F_{ск} = \frac{3}{5}mg}$

(7)

$\frac{F}{mg} = \cos\alpha = \frac{4}{5}$

$4mg \to 5F$; $\boxed{F = \frac{4}{5}mg}$

$ma = \frac{3}{5}mg$

$\boxed{a = \frac{3}{5}g} \Rightarrow \boxed{\sin\alpha = \frac{3}{5}}$

$\frac{H}{S} = \sin\alpha = \frac{3}{5}$; $3S = 5H$; $\boxed{S = \frac{5}{3}H}$

~~$\frac{16}{25} + \sin^2 = 1$; $\frac{9}{25} = \sin\alpha = \frac{3}{5}$~~

$S = \frac{5}{3}H = \frac{at^2}{2} = \frac{0{,}6gt^2}{2} = 0{,}3gt^2 = \frac{3}{10}gt^2$

$\frac{5}{3}H = \frac{3}{10}gt^2$; $50H = 9gt^2$

$t^2 = \frac{50H}{9g}$; $t = \sqrt{\frac{50H}{9g}} = \sqrt{\frac{25 \cdot 2H}{3^2 \cdot g}} =$

$= \boxed{\frac{5}{3}\sqrt{\frac{2H}{g}} = t}$ 1.1.

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(2)