Часть 1

Олимпиада: **Физика, 10 класс (1 часть)**

Шифр: **21205151**

ID профиля: **281434**

Вариант 1

Чистовик-1

№3

$m_0 = 32$
$T = const$
$T = 354\ K$
$V_2 = \frac{V_1}{3,5}$
$p_2 = 1,8\,p_1$
$p_н(354K) = 0,5 \cdot 10^5\ Па$
$\mu = 18\ \frac{г}{моль}$

$p_1 - ?$
$V_2 - ?$

$\mu p_1 V_1 = m_0 RT$
$\mu p_2 V_2 = m_2 RT$

1) $p_2 = 1,8 p_1 = p_н$

$p_1 = \frac{p_н}{1,8} = \frac{0,5 \cdot 10^5}{1,8}\ Па = 27778\ Па$

Если бы $m_1 = m_2$, то
$p_1 V_1 = p_2 V_2 \neq p_1 V_1 \cdot \frac{18}{35}$

$\Downarrow$

$m_2 = \frac{18}{35} m_1$

$\Downarrow$

часть пара конденсировалась

$\Downarrow$

$p_2 = p_н$ (насыщ. пара)

2) $\mu p_1 3,5 V_2 = m_1 RT$

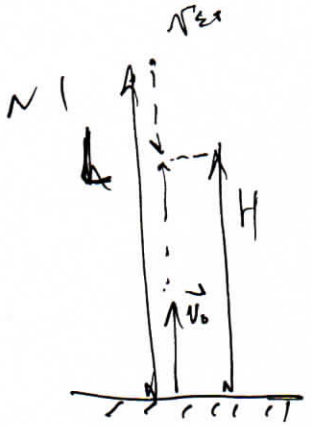
$V_2 = \frac{m_1 RT \cdot 1,8}{3,5 \mu p_н} = \frac{18 \cdot 0,003 \cdot 8,31 \cdot 354}{35 \cdot 0,018 \cdot 0,5 \cdot 10^5}\ м^3 =$

$= \frac{3 \cdot 8,31 \cdot 354}{35 \cdot 0,5 \cdot 10^5}\ м^3 = 5.043 \cdot 10^{-3}\ м^3$

Ответ: $p_1 = 27778\ Па$
$V_2 = 5.043 \cdot 10^{-3}\ м^3$

Чистовик – 2

№1



1) $H = v_0 t - \frac{gt^2}{2}$ (1) ЗСЭ: $\frac{mv_0^2}{2} = mgL$

$L - H = \frac{gt^2}{2}$ (2) $L = \frac{v_0^2}{2g}$ (3)

Из (1): $v_0 = \frac{H}{t} + \frac{gt}{2}$ (4)

(3) во (2): $\frac{v_0^2}{2g} - H = \frac{gt^2}{2}$ (5)

(4) в (5): $\left(\frac{H}{t} + \frac{gt}{2}\right)^2 \frac{1}{2g} - H = \frac{gt^2}{2}$

$\frac{H^2}{2gt^2} + \frac{g^2t^2}{4\cdot 2g} + \frac{gtH}{2gt} - H = \frac{gt^2}{2}$

$\frac{H^2}{2gt^2} + \frac{gt^2}{8} + \frac{H}{2} - \frac{H}{2} = \frac{gt^2}{2} \quad | \cdot 8gt^2 \neq 0$

$\frac{3gt^2}{8} + \frac{H}{2} - \frac{H^2}{2gt^2} = 0$

$3g^2t^4 + 4gHt^2 - 4H^2 = 0$

$\frac{D}{4} = 4g^2H^2 + 4H^2 \cdot 3g^2 = 16g^2H^2$

$t^2 = \frac{-2gH \pm 4gH}{3g^2}$, $t^2 > 0 \Rightarrow t^2 = \frac{2gH}{3g^2} = \frac{2H}{3g}$

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

2) $v_0 = \frac{H}{t} + \frac{gt}{2} = \frac{H\sqrt{3g}}{\sqrt{2H}} + \frac{g}{2}\sqrt{\frac{2H}{3g}} = \sqrt{\frac{3gH^2}{2H}} + \sqrt{\frac{2Hg^2}{3g\cdot 4}} =$

$= \sqrt{\frac{3gH}{2}} + \sqrt{\frac{gH}{6}} = \sqrt{\frac{gH}{2}}\left(\sqrt{3} + \frac{\sqrt{3}}{3}\right) = \sqrt{\frac{gH}{2}}\left(\frac{4\sqrt{3}}{3}\right) = \boxed{\frac{4}{3}\sqrt{\frac{3gH}{2}}}$

$\sqrt{\frac{8\cdot 3gH}{9\cdot 2}}$

$\sqrt{\frac{8gH}{3}}$

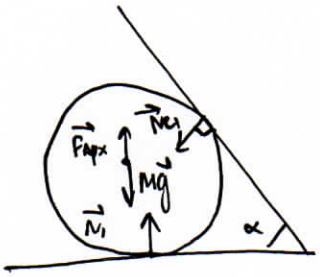
3) $S = L + L - H = 2L - H = \frac{2v_0^2}{2g} - H = \frac{v_0^2}{g} - H = \frac{16}{9}\cdot\frac{3gH}{2g} - H =$

$= \frac{8H}{3} - H = H\left(\frac{8}{3} - \frac{3}{3}\right) = \boxed{\frac{5}{3}H}$

Ответ: 1) $t = \sqrt{\frac{2H}{3g}}$ 2) ~~$v_0 = \frac{4}{3}\sqrt{\frac{3gH}{2}}$~~ 3) $S = \frac{5H}{3}$ 2) $v_{0\min} = \sqrt{\frac{8gH}{3}}$

Чистовик – 3

N2 1)



N_{c1} – сила давления стены

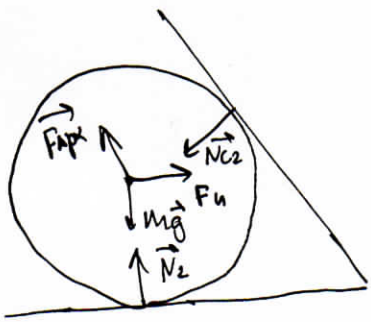
$N_{c1} = 0$, т.к. ускорение шара по горизонтали равно нулю $\Rightarrow$ горизонт. состав. $N_{c1x} = 0$, $N_{c1} = 0$. (направл. N_{c1} задано однозначно: $\perp$ пов-ти)

$$mg = N_1 + F_{Apx} \Rightarrow N_1 = mg - \rho g V = 3\rho g V - \rho g V = 2\rho g V =$$

$$= 2\rho g \frac{4}{3}\pi R^3 = \boxed{\frac{8\rho g \pi R^3}{3}}$$

2) Перейдём в НИСО, связанную с сосудом.

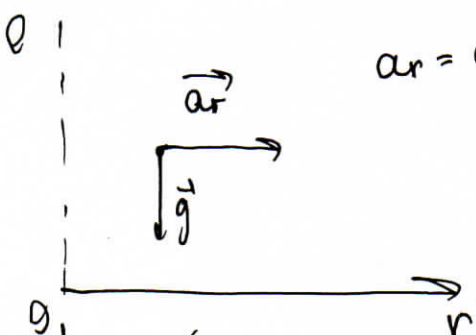
~~Ускорение центра~~ к центру масс шара приложена сила инерции $F_u = m\omega^2 \cdot 2R$ (ВПРАВО)



Сила архимеда делится на вертик. горизонт. состав. $F_{Ay} = \rho g V$

И горизонтал.: F_{Ax}.

Посчитаем F_{Ax}. ускорение воды по горизонтали зависит от r.

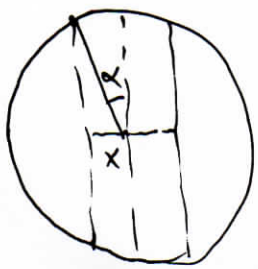


$a_r = \omega^2 r$. Давление воды (по горизонтали) $dp_x = \rho \omega^2 r \cdot dr$

$$p_x(r) = \frac{\rho \omega^2 r^2}{2}$$

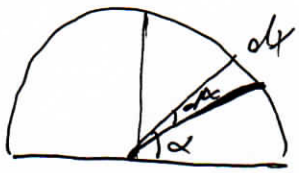
Найдём силу F_{Ax}:

$$dF_{Ax} = \left(\frac{\rho\omega^2 r^2}{2} - \frac{\rho\omega^2}{2}(r+2x)^2\right) dS = \frac{\rho\omega^2}{2}\left(4x^2 + 4xr\right) dS$$



Шестёрка – 4

$dF_{apx} = 2p\omega^2(x^2 + xr)\,dS$



$dS:\ 2\pi R\cos\alpha \cdot dx = 2\pi R^2 \cos\alpha \cdot d\alpha$

$dx = \frac{dx}{R}$

$dF_{Ax} = 2p\omega^2(x^2 + xr) \cdot 2\pi R^2 \cos\alpha \cdot d\alpha \qquad x = R\sin\alpha$

$dF_{Ax} = 2p\omega^2\pi R^2 \cdot R^2 \sin^2\alpha \cdot \cos\alpha \cdot d\alpha + 4\pi R^2 p\omega^2 \cdot r R \sin\alpha \cos\alpha \cdot d\alpha$

$4\pi R^2 p\omega^2 \left(R^2 \sin^2\alpha \cos\alpha \cdot d\alpha + rR\sin\alpha\cos\alpha\, d\alpha\right)$

$\left(R^2\cos\alpha \cdot d\alpha - R^2\cos^3\alpha \cdot d\alpha + rR\frac{\sin 2\alpha}{2} d\alpha\right)$

$\left(R^2\sin\alpha - R^2\int\cos^3\alpha \cdot d\alpha + \frac{rR}{2}\frac{\cos\alpha}{2}\right)$

$r = R + (R - R\sin\alpha) = 2R - R\sin\alpha$

$R - r = R\sin\alpha$

$r = R(1 - \sin\alpha)$

$R(2 - \sin\alpha)$

$R^2(2 - \sin\alpha)\sin\alpha\cos\alpha\, d\alpha \qquad R^2\left(2 - \sin\alpha\right)\frac{\sin 2\alpha}{2} d\alpha$

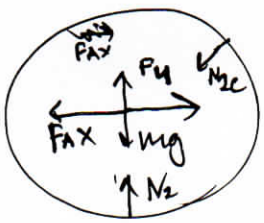
$R^2\left(\frac{\sin 2\alpha}{2} - \sin^2\alpha\cos\alpha\right) \qquad R^2\left(\sin 2\alpha - \sin^2\alpha\cos\alpha\right)$

$d\alpha\, R^2\left(\sin^2\alpha\cos\alpha + 2\sin\alpha\cos\alpha - \sin^2\alpha\cos\alpha\right)$

$dF_{Apx} = 4\pi R^4 p\omega^2 \left(2\sin\alpha\cos\alpha \cdot d\alpha\right)$

$F_{apx} = \frac{4\pi R^4 p\omega^2}{2}\left(-\frac{\cos 2\alpha}{2}\right)\Big|_{\frac{\pi}{2}}^{0} = \frac{4\pi R^4 p\omega^2}{2}\left(-\cos\pi + \cos 0\right) =$

$= 2\pi R^4 p\omega^2$



$N_{2c}\sin\alpha + 2\pi R^4 p\omega^2 = m\omega^2 2R$

$N_{2c} = \frac{\frac{8}{3}p \cdot \frac{8}{3}\pi R^4\omega^2 - 2\pi R^4 p\omega^2}{\sin\alpha} = \frac{\pi R^4 p\omega^2\left(8 - 2\right)}{\sin\alpha} = \frac{4\pi R^4 p\omega^2}{\sin\alpha}$

$N_2 = mg + N_{2c}\cos\alpha - pgV = \frac{8}{3}pg\frac{4}{3}\pi R^3 - \frac{4\pi R^4 p\omega^2}{\sin\alpha}\cos\alpha - pg\frac{4}{3}\pi R^3 =$

$= p\pi R^3\left(\frac{12}{3}g - \frac{4R\omega^2}{tg\alpha} - \frac{4}{3}g\right) = p\pi R^3\left(\frac{8g}{3} - \frac{4R\omega^2}{tg\alpha}\right)$

Чистовик - 5

$$N_2 = \rho\pi R^3\left(\frac{8g}{3} - \frac{6R\omega^2}{3}\right) = \frac{\rho\pi R^3}{3}(8g - 6R\omega^2)$$

Ответ: $N_2 = \frac{2\rho\pi R^3}{3}(4g - 3R\omega^2)$.

Чертеж-1

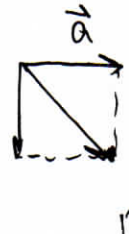
$\frac{mV^2}{2} = mgh$

$V_0^2 = 2gh$

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

$\frac{v_0^2}{2g} - H = \frac{gt^2}{2}$

$H = v_0 t - \frac{gt^2}{2}$



$\frac{v_0^2}{2g} - H = \frac{gH^2}{2v_0^2} + \frac{g^2t}{2}$

$\frac{H}{t} + \frac{gt^2}{2v_0} = v_0$ $\quad \frac{H + \frac{gt^2}{2}}{t} = v_0$

$2g\frac{H^2}{t^2} + \frac{g^2t^2}{2g} + \frac{gtH}{2gt}$

$\frac{H^2}{2gt^2} + \frac{gt^2}{8} + \frac{gH}{2g} - H = \frac{gt^2}{2}$

$4H^2 + g^2t^4 + 4gt^2H - 8gt^2H = 4g^2t^4$

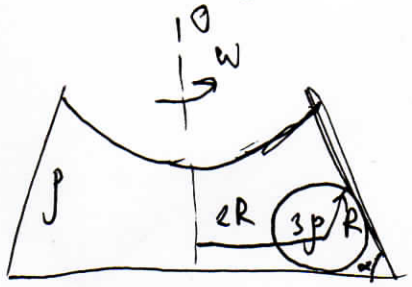
$3g^2t^4 + 4gt^2H - 4H^2 = 0$

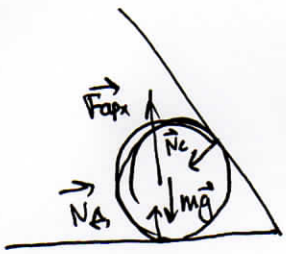
$t = \sqrt{\frac{2H}{3g}}$

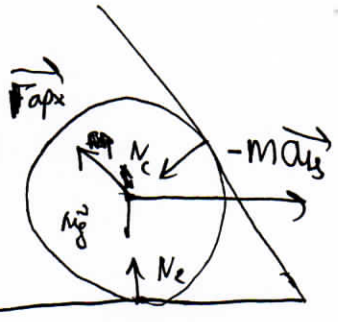
$\frac{D}{4} = 4g^2H^2 + 4H^2 \cdot 3g^2 = 16H^2g^2$

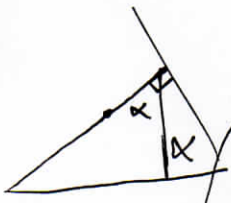
$t^2 = \frac{-2gH \pm 4gH}{3g^2}$

$\frac{2gH}{3g^2} = \frac{2}{3}\frac{H}{g}$









! Учесть объём сконц. жир-ти.

$mg = N_A + F_{apx}$

$N_A = mg - F_{apx} = V \cdot 3\rho g - \rho g V = 2\rho g V = 2\rho g \frac{4}{3}\pi R^3 =$

$= \frac{8}{3}\rho g \pi R^3$

$pV = \nu RT$

$\mu pV = m_0 RT$

$\frac{\mu pV}{RT} = m_0$

$\frac{18}{35}\mu pV = m_1 RT$

$\frac{18}{35} = \frac{m_1}{m_0}$

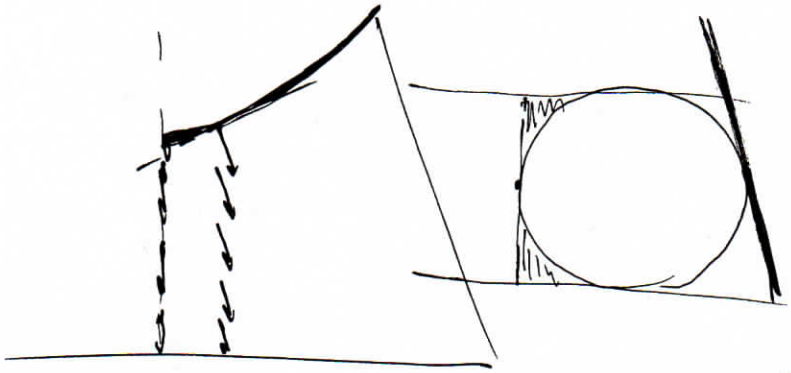
$1{,}8\,\mu p \frac{V}{3{,}5} = m_1 RT$

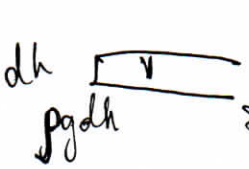
$\frac{5}{18} \cdot 10^5$

$1{,}8p \le p_н$

$p \ge \frac{p_н}{1{,}8} = \frac{5 \cdot 10^5}{18}$

Черновик-2





dh $\rho g dh$

$\rho r \omega^2 \cdot dr$

$\frac{\rho \omega^2 r^2}{2}$

$\cos 2\alpha$

$\cos^3\alpha$

$\cos\alpha > -\sin\alpha$

$\sin\alpha < \cos\alpha$

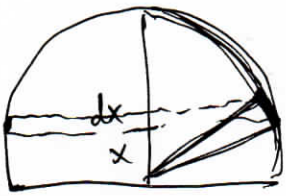
$1 - \cos^2\alpha$

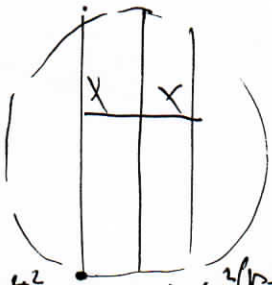
$S = \frac{\cos 2\alpha}{2}$

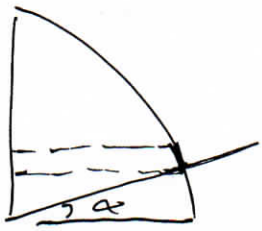
$\sin 2\alpha$

$\frac{\sin^4\alpha}{4}$

$\sin^3\alpha \cos\alpha$







$\frac{\rho \omega^2 r^2}{2}$ $\frac{\rho \omega^2 (r+2x)^2}{2}$

$\frac{\rho \omega^2}{2}\left(r^2 + 4x^2 + 4xr - x^2\right)$

$\frac{\rho \omega^2}{2} 4x(x+r)$

$2\rho\omega^2 x(x+r)$

$S \sin\alpha \, d\alpha = \frac{dx}{R}$

$S = 2\pi R \cos\alpha \cdot dx =$

$= 2\pi R^2 \cos\alpha \, d\alpha$

$dF = 2\rho\omega^2 x(x+r) \cdot 2\pi R^2 \cos\alpha \, d\alpha$

$2\rho\omega^2 R^2 \sin^2\alpha \, 2\pi R^2 \cos\alpha \, d\alpha$

$x = R\sin\alpha$

$2\rho\omega^2 R^3 \sin$

$\sin^2\alpha \cdot \cos\alpha \cdot d\alpha$

$\sin 2\alpha \cdot \sin\alpha$

$\cos\alpha - \cos^3\alpha$

$\cos^3\alpha$

$\frac{\cos^4\alpha}{4}$

Часть 2

Олимпиада: **Физика, 10 класс (2 часть)**

Шифр: **21205151**

ID профиля: **281434**

Вариант 1

Чистовик-1

№5 $\Delta V = -0{,}01V$

$\Delta p = 0{,}02p$

$\frac{\Delta p}{p}, \frac{\Delta V}{V}, \frac{\Delta T}{T} \ll 1$

1) $\frac{\Delta T}{T} - ?$

2) $\frac{Q}{A} - ?$

1) $pV = \nu RT$ $\quad \Delta p V + p \Delta V = \nu R \Delta T$ (т.к. относит. изменением малы)

$$\Delta T = \frac{\Delta p V}{\nu R} + \frac{p \Delta V}{\nu R} = \frac{0{,}02 pV}{\nu R} - \frac{0{,}01 pV}{\nu R} =$$

$$= \frac{0{,}01 pV}{\nu R} = \frac{0{,}01 \nu RT}{\nu R} = 0{,}01 T \Rightarrow$$

T увеличилась на 1%.

2) $Q = A + \frac{3}{2}\nu R \Delta T$

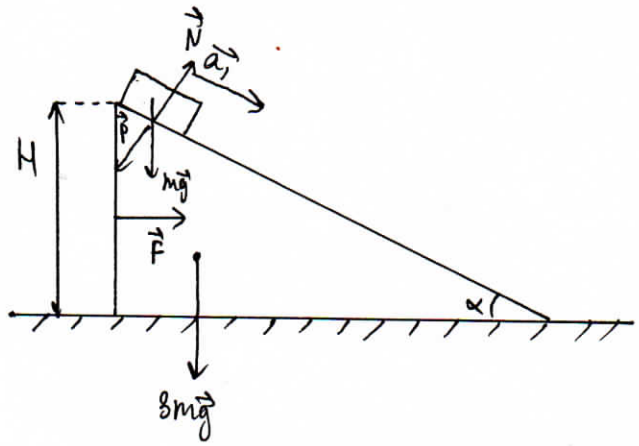
$$\frac{Q}{A} = 1 + \frac{3}{2}\frac{\nu R \Delta T}{p \Delta V} = 1 + \frac{3}{2}\left(\frac{\nu R \cdot 0{,}01 T}{-p 0{,}01 V}\right) = 1 - \frac{3}{2}\underbrace{\frac{\nu RT}{pV}}_{1} = -\frac{1}{2}$$

Ответ: 1) Температура газа увеличилась на 1%.

2) $\frac{Q}{A} = -\frac{1}{2}$.

Чистовик - 2

№4



1) a_1 - ускорение клина, когда клин удерживают.

$ma_1 = mg\sin\alpha$ (II з-н Ньютона)

$a_1 = g\sin\alpha$

$\frac{H}{L} = \sin\alpha \Rightarrow L = \frac{H}{\sin\alpha}$

$L = \frac{a_1 t^2}{2} \Rightarrow t^2 = \frac{2L}{a_1} = \frac{2H}{a_1\sin\alpha} = \frac{2H}{g\sin^2\alpha} = \frac{2H}{g(1-\cos^2\alpha)} = \frac{2H}{g\left(1-\frac{16}{25}\right)} = \frac{2H\cdot 25}{g\cdot 9} =$

$= \frac{50H}{9g}$

$\boxed{t = \sqrt{\frac{2\cdot 25\,H}{9\cdot g}} = \frac{5}{3}\sqrt{\frac{2H}{g}}}$

2) II з-н Ньютона для клина на горизонтальную ось:

$3ma = F - P\sin\alpha$

$P = N = mg\cos\alpha$

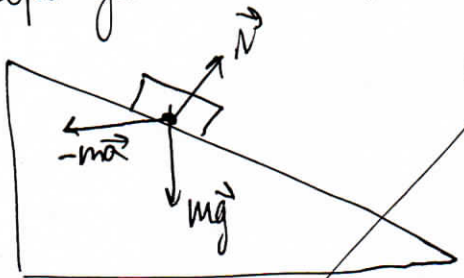
$3ma = 2mg - mg\sin\alpha\cos\alpha \Rightarrow \boxed{a = g\,\frac{2-\sin\alpha\cos\alpha}{3}}$

$\sin\alpha = \sqrt{1-\cos^2\alpha}$ $(\sin\alpha > 0)$

$\sin\alpha = \sqrt{\frac{25}{25} - \frac{16}{25}} = \frac{3}{5}$

$a = g\,\frac{2 - \frac{3}{5}\cdot\frac{4}{5}}{3} = g\,\frac{50-12}{3\cdot 25} = g\,\frac{38}{3\cdot 25} = \boxed{0{,}51\,g}$

3) Перейдём в НИСО, связанную с клином:



$\vec{a}$

$ma_2 = mg\sin\alpha - ma\cos\alpha =$

$= mg\sin\alpha - mg\left(\frac{2-\sin\alpha\cos\alpha}{3}\right)\cos\alpha$

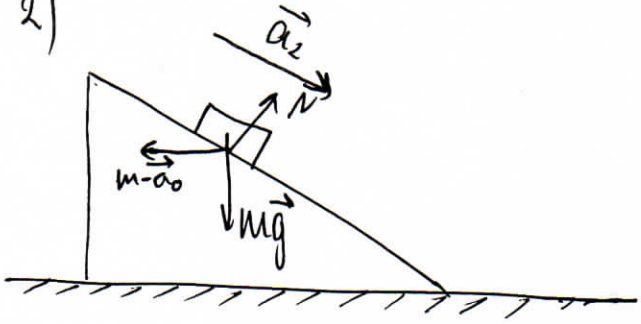
$a_2 = g\left(\sin\alpha - \frac{2\cos\alpha - \sin\alpha\cos^2\alpha}{3}\right) = g\left(\frac{3}{5} - \frac{\frac{2\cdot 4}{5} - \frac{3\cdot 4\cdot 4}{5\cdot 5\cdot 5}}{3}\right)$

$= g\left(\frac{3\sin\alpha - 2\cos\alpha + \sin\alpha\cos^2\alpha}{3}\right) = g\,\frac{\sin\alpha(3+\cos^2\alpha) - 2\cos\alpha}{3} =$

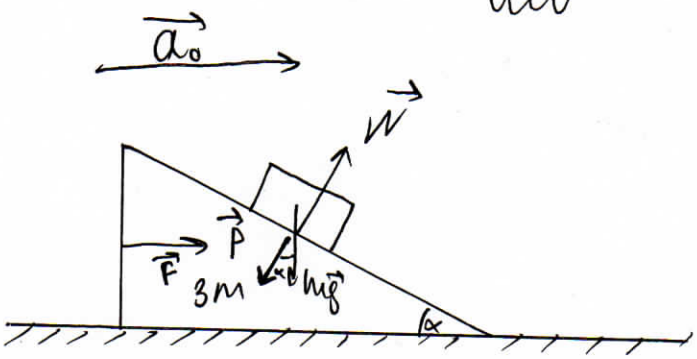
$= g\,\frac{(4-\sin^2\alpha)\sin\alpha - 2\cos\alpha}{3} = g\left(\frac{3}{5} - \frac{2\cdot 4\cdot 5\cdot 5 - 3\cdot 4\cdot 4}{3\cdot 5\cdot 5\cdot 5}\right) = g\left(\frac{3}{5} - \frac{4}{5\cdot 5\cdot 5}(50-12)\right)$

Чистовик – 3

2) НИСО



ИСО



~~$N = mg\sin\alpha - ma_0\cos\alpha$~~

$N = mg\cos\alpha + ma_0\sin\alpha$

$3ma_0 = F - P\sin\alpha$

$P = N = m(g\cos\alpha + a_0\sin\alpha)$

$3ma_0 = 2mg - m\sin\alpha(g\cos\alpha + a_0\sin\alpha)$

$3a_0 = 2g - g\sin\alpha\cos\alpha + a_0\sin^2\alpha$

$a_0(3 + \sin^2\alpha) = g(2 - \sin\alpha\cos\alpha) = g\left(2 - \frac{3\cdot 4}{25}\right) = g\,\frac{50-12}{25}$

$3 + \frac{9}{25}$

$$a_0 = g\,\frac{38}{25}\cdot\frac{25}{84} = 4{,}52\ \frac{м}{с^2}$$

3) $ma_2 = mg\sin\alpha - ma_0\cos\alpha \Rightarrow L = \frac{a_2 t_2^2}{2} \Rightarrow t_2^2 = \frac{2L}{a_2} = \frac{2H}{a_2\sin\alpha} =$

$$= \frac{2H}{(g\sin\alpha - a_0\cos\alpha)\sin\alpha} = \frac{2H}{\left(g\cdot\frac{3}{5} - \frac{38}{84}\cdot\frac{4}{5}g\right)\frac{3}{5}} = \frac{2H\cdot 5}{g\cdot 3}\left(\frac{1}{\frac{84\cdot 3}{84\cdot 5} - \frac{38\cdot 4}{84\cdot 5}}\right) =$$

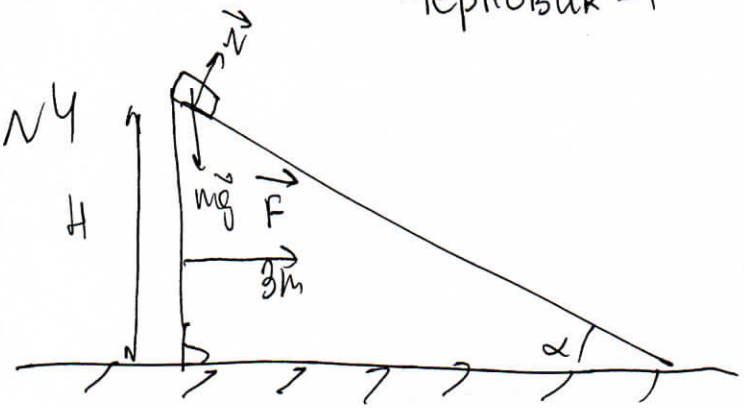
$$= \frac{2H\cdot 5}{3g}\left(\frac{84\cdot 5}{252-152}\right) = \frac{2\cdot 5^2\cdot 84\cdot H}{3\cdot 100\cdot g} = \frac{28\cdot 5\,H}{20\,g} = 14\,\frac{H}{g}$$

$$t_2 = \sqrt{\frac{14H}{g}}$$

Ответ: 1) $t_1 = \frac{5}{3}\sqrt{\frac{2H}{g}}$ 2) $a_0 = 4{,}52\ \frac{м}{с^2}$ 3) $t_2 = \sqrt{\frac{14H}{g}}$.

Черновик - 1

№4



$Q = p\Delta V + \frac{3}{2}\nu R\Delta T =$

$= \nu R\Delta T - \Delta pV + \frac{3}{2}\nu R\Delta T = \frac{5}{3}\nu R\Delta T -$

$-0{,}02pV =$

$\frac{\Delta V}{V} << 1$ $\frac{\Delta T}{T} << 1$

$= \frac{5}{3}\nu R\Delta T - 0{,}02\nu RT =$

№5 идеальный одноатомный.

$\Delta p = 0{,}02p$

$\Delta V = -0{,}01V$

$\frac{\Delta p}{p} < 1$

$= \frac{5}{3}\nu R\Delta T - \frac{6}{3}\nu R\Delta T =$

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

$pV = \nu RT_1$

$\frac{1{,}02}{0{,}99}pV = \nu RT_2$

$\frac{Q}{A}$

$Q = \frac{3}{2}\nu R\Delta T + p\Delta V$

$\frac{Q}{p\Delta V} = \frac{3}{2}\frac{\nu R\Delta T}{p\Delta V} + 1$

$Q < 0$

$A < 0$ $\Big| = ???$

$T_1 = \frac{pV}{\nu R}$

$T_2 = \frac{pV}{\nu R}\cdot\frac{102}{99}$

3,03 %

$\frac{\Delta pV}{p\Delta V} + \frac{p\Delta V}{p\Delta V} = \frac{\nu R\Delta T}{p\Delta V}$

$\frac{T_2}{T_1} = \frac{102}{99} =$

$\frac{\Delta p}{p}\cdot\frac{V}{\Delta V} + 1 = 0{,}02(-0{,}01) + 1$

$A = p\Delta V = -0{,}01pV =$

$= -0{,}01\nu RT$

$\frac{3}{2}\nu R\Delta T = \frac{3}{2}\nu R\cdot 0{,}01T$

$(p+\Delta p)(V+\Delta V) = \nu R(T+\Delta T)$

$pV + p\Delta V + \Delta pV = \nu RT + \nu R\Delta T$

$p\Delta V =$

$Q = \nu RT\left(\frac{3}{2\cdot 100} - \frac{2}{200}\right)$

$\frac{T_2 - T_1}{T_1} \to \frac{T_2}{T_1} - 1 = \nu RT\left(\frac{1}{200}\right)$

$1{,}02p$

$0{,}99V$

$1{,}02\cdot 0{,}99\,pV$

$1{,}02\cdot 0{,}99\,\nu RT_1 = \nu RT_2$

$0{,}02pV - 0{,}01pV$

$0{,}01pV = 0{,}01\nu RT = \nu R\Delta T$

$\Delta T = T_K - T_H = 0{,}01T$

$\Delta T = T_1(1{,}02\cdot 0{,}99 - 1)$ 101

$\frac{Q}{A} = \frac{1100}{200 -}$

~~Чистовик - 3~~ Черновик - 2

$a_2 = g\left(\frac{3}{5} - \frac{4 \cdot 19 \cdot 2}{3 \cdot 5^3}\right) = g\frac{3 \cdot 3 \cdot 5^2 - 38 \cdot 4}{3 \cdot 5^3} = g\,\frac{225 - 152}{375} = \frac{73}{375}g$

$L = \frac{a_2 t_2^2}{2} \Rightarrow t_2^2 = \frac{2L}{a_2} = \frac{2H}{a_2 \sin\alpha} = \frac{2H \cdot 375}{73 g \sin\alpha} =$

$= \frac{2H \cdot 375 \cdot 5}{73 \cdot g \cdot 3} = \frac{125 \cdot 10\,H}{73\,g} = \frac{1250H}{73g}$

$t_2 = \sqrt{\frac{1250H}{73g}} = 4{,}14\sqrt{\frac{H}{g}}$