Часть 1

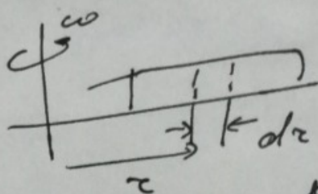
Олимпиада: **Физика, 10 класс (1 часть)**

Шифр: **21205861**

ID профиля: **202658**

Вариант 2

Черновик



$$\cancel{dm}\ dm\,\omega^2 r = \cancel{dS}\, S\cdot\left(P(dr+r)-P(r)\right)$$

$$S\rho dr$$

$$\omega^2 \cancel{S}\rho r dr = \cancel{S} dP(r)$$

$$\omega^2\rho r dr = dP(r)$$

$$\omega^2\rho\int_{r_1}^{r_2} r dr = P_2-P_1$$

$$\omega^2\rho\,\frac{r_2^2-r_1^2}{2} = P_2-P_1$$

$$\frac{1}{c^2}\cdot\frac{кг}{м^3}\cdot м^2 \qquad \frac{кг\cdot\frac{м}{c^2}}{м^2}=\frac{кг}{м\cdot c^2}$$

$$d(\cos^3\alpha) = \cancel{3\cos^2\alpha\cos\alpha}\ 3\cos^2\alpha\, d\cos\alpha$$

$$-\sin\alpha\, d\alpha$$

$$(x^3)' = 3x^2$$

$$dx^3 = 3x^2 dx$$

$$d\cos^3\alpha = -3\cos^2\alpha\sin\alpha\, d\alpha$$

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

$$d(\sin^4\alpha) = 4\sin^3\alpha\, d\sin\alpha = 4\sin^3\alpha\cos\alpha\, d\alpha$$

$$d\left(\frac{\sin^4\alpha}{4}\right) = \sin^3\alpha\cos\alpha\, d\alpha$$

$$d(\sin\alpha\cos\alpha) = \sin\alpha\cdot(-\sin\alpha)+\cos^2\alpha = \cos^2\alpha-\sin^2\alpha$$

$$d(\sin^2\alpha\cos\alpha) = \sin^2\alpha\sin\alpha - 2\cos\alpha\cdot\sin\alpha\cdot\cos\alpha =$$

$$= \sin^3\alpha - 2\cos^2\alpha\sin\alpha = \sin\alpha(\sin^2\alpha-\cos^2\alpha$$

$\cancel{6\rho\frac{4}{3}\pi R^3\omega^2\frac{3}{2}R = N_3\sin\alpha +}$

$6\rho\frac{4}{3}\pi R^3\omega^2\frac{3}{2}R = N_3\sin\alpha + \rho\frac{4}{3}\pi R^3$

$m\omega^2\frac{3}{2}R = N_3\sin\alpha + F_a$

$\frac{4}{3}\pi R^3 6\rho\omega^2\frac{3}{2}R \qquad \frac{4}{3}\pi R^3\rho\cdot\omega^2\frac{3}{2}R$

$N_3\sin\alpha = 5\rho\cdot\frac{4}{3}\pi R^3\omega^2\frac{3}{2} = 10\rho\pi R^4\omega^2$

$N_3\cos\alpha + 6\rho\frac{4}{3}\pi R^3 g = N_2 + \frac{4}{3}\pi R^3\rho g$

$N_2 = \rho\frac{20}{3}\pi R^3 g + 10\rho\pi R^4\omega^2\cdot\operatorname{ctg}\alpha =$

$= \left(\frac{20}{3}g + 10R\omega^2\frac{3}{3}\right)\pi R^3$

От

6

$\frac{кг\cdot\frac{м}{с^2}}{м^2} = \frac{кг}{м\cdot с^2}$

Чистовик

Продолжение 2ой задачи

$$F_x = 2\pi \rho \omega^2 R^4 \int_0^{\pi/2} \cos^2\alpha \sin^2\alpha \, d\alpha = \int_0^{\pi/2} \sin^2\frac{2\alpha}{2} \, d\alpha$$

$$= \cancel{\frac{2\pi}{3} \rho \omega^2 R^4 \cdot \left(-\frac{\cos^3\alpha}{3}\right)\Big|_0^{\pi/2} = \frac{2\pi}{3} \rho \omega^2 R^4 \left(\frac{\ldots^3}{3} - \frac{1}{3}\right)}$$

$$= \cancel{2\pi \rho \omega^2 R^4 \left(-\frac{1}{3}\right)\left(\left(\frac{\ldots}{4}\right)^3 - 1\right) = \frac{2\pi}{3} \rho \omega^2 R^4}$$

-1

$$\cancel{F_x = \frac{2\pi}{3} R^3 \rho \omega^2 R = \frac{V}{2} \rho \omega^2 \frac{3}{2} R \cdot \frac{2}{3}}$$

$\cancel{r_m}$ расстояние до центра

$$\cancel{\frac{4}{3}\pi R^3 = V}$$

$$\cancel{F_x = \frac{2\pi}{3} R^4 \rho \omega^2}$$

2) 2ой з-н Ньютона на ось X:

$$N_3 \sin\alpha + F_x = \cancel{m\omega^2} \, m A$$

$$\cancel{\ldots} \, dm \, \omega^2 \cdot X = 6\rho\omega^2 \left(\frac{3}{2}R - R\cos\alpha\right) \cancel{\ldots} \pi R^2 \sin^2\alpha (-\sin\alpha \, d\alpha) R$$

$$dm = d\cos\alpha \, R \, \pi R^2 \sin^2\alpha \cdot 6\rho$$

$$6\rho(-\omega^2)\left(\frac{3}{2} - \cos\alpha\right) \pi R^4 \sin^3\alpha \, d\alpha =$$

$$= 6\rho\omega^2 \pi R^4 \left(\sin^3\alpha \cos\alpha \, d\alpha - \frac{3}{2} \sin^3\alpha \, d\alpha\right)$$

$N_3 \sin\alpha +$

$\cancel{\ldots}$ суммируем по симметр. точкам

$$\int dm_i a_i = m \omega^2 \frac{3}{2} R$$

5 6

21205861 (U202658 M1282350)

№3 Чистовик

$V = 1{,}7\ л \qquad 7V \to V$

$P_н(t_1) = 0{,}5 \cdot 10^5\ Па$

$\mu = 18\ \frac{г}{моль} \qquad \frac{P}{3{,}6} \to P$

$R = 8{,}31\ \frac{Дж}{моль \cdot К}$

$t_1 = 81\ ^\circ C = 354\ K$

$P_1 - ?\ m_1 - ?$

$\frac{P}{3{,}6} \cdot 7V = \nu_1 RT$

$P \cdot V = \nu_2 RT$

$P_1V_1 = \nu_1 RT_1$

$P_2V_2 = \nu_2 RT_2$

$T_1 = const = T_2 = T$

$P_1 = \frac{P}{3{,}6}$

$P_2 = P$

$V_1 = 7V$

$V_2 = V$

$\frac{\nu_1}{\nu_2} \neq 1 \Rightarrow$ пар отчасти конденсировался $\Rightarrow P = P_н$ стал насыщ.

$\frac{\nu_1}{\nu_2} = \frac{7}{3{,}6} = \frac{70}{36} = \frac{35}{18}$

$$P_1 = \frac{P}{3{,}6} = \frac{P_н}{3{,}6} = \frac{0{,}5 \cdot 10^5}{3{,}6} = 13888{,}89\ Па$$

$m_1 = \nu_1 \cdot \mu \qquad \nu_1 = \frac{35}{18} \cdot \frac{PV}{RT_1} = \frac{35}{18} \cdot \frac{P_н V_1}{RT_1} = \frac{35 \cdot \frac{1}{2} \cdot 10^5 \cdot 1{,}7 \cdot 10^{-3}}{18 \cdot 8{,}31 \cdot 354} =$

$$m_1 = \frac{35}{18} \cdot \frac{P_н V_1 \mu}{RT_1} = \frac{35 \cdot \frac{1}{2} \cdot 10^5 \cdot 1{,}7 \cdot 10^{-3}}{18 \cdot 8{,}31 \cdot 354} = 0{,}0562\ кг$$

Ответ: 1) $P_1 = \frac{P_н}{3{,}6} = 13888{,}89\ Па$; 2) $m_1 = 0{,}0562\ кг$

Чистовик

2ой з-н Ньютона на x:

$$m\omega^2 \frac{3}{2}R = N_3 \sin\alpha + F_a''$$

Рассмотрим маленький верт. слой жид. толщиной dx и расст. до оси x.

2ой з-н Ньютона для этого куска:

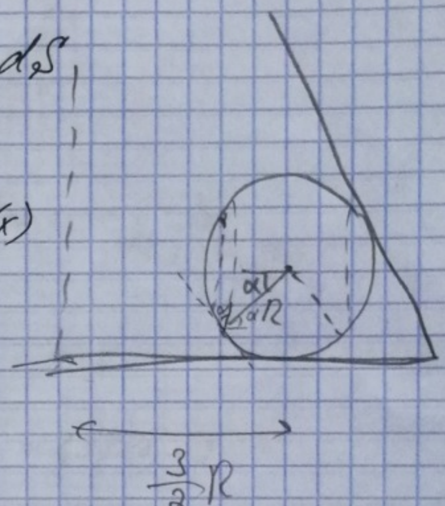
$$dm\,\omega^2 x = (P(dx+x) - P(x))\,dS$$

$$dm = dS\,dx\,\rho$$

$$\cancel{dS}\,dx\,\rho\,\omega^2 x = \cancel{dS}\,dP(x)$$

$$\rho\omega^2 \int_{x_1}^{x_2} x\,dx = \int_{P_1}^{P_2} dP(x)$$

$$\frac{\rho\omega^2}{2}(x_2^2 - x_1^2) = P_2 - P_1$$



$$dF = dS \cdot \frac{\Delta P}{\cos\alpha} = dS\,\frac{\rho\omega^2}{2}\Big(\underbrace{\tfrac{3}{2}R + R\cos\alpha}_{x_2} - \underbrace{\tfrac{3}{2}R + R\cos\alpha}_{-x_1}\Big)\big(\tfrac{3}{2}R + R\cos\alpha + \tfrac{3}{2}R - R\cos\alpha\big)$$

$$dF = \frac{\rho\omega^2}{\cancel{2}}\,dS\,(2R\cos\alpha)(3R)\cos\alpha$$

$$dF = \rho\omega^2 R^2\, dS\, c\cos^2\alpha$$

$$F_{a3} = \rho\omega^2 R^2 \int_0^{\pi/2} dS\cos^2\alpha \qquad dS = R\,d\alpha \cdot 2\pi R\sin\alpha \cdot$$

~~Проекция на~~

$$F_3 = 2\pi\rho\omega^2 R^4 \int_0^{\pi/2} \cos^2\alpha\sin^2\alpha\, d\alpha = 2\pi\rho\omega^2 R^4 \int_0^{\pi/2} \sin^2\frac{2\alpha}{2}\,d\alpha$$

$-\sin\alpha\, d\alpha$

$(x^3)' = 3x^2$

$dx^3 = 3x^2 dx$

3

№2 Чистовик

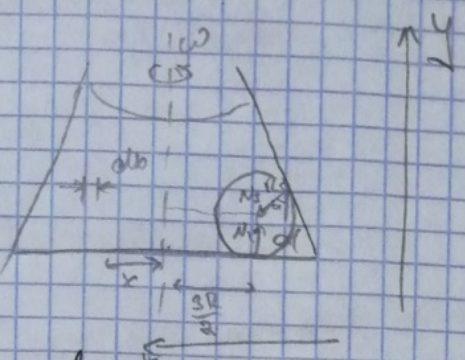
$\omega;\ \rho;\ \rho_ш = 6\rho;\ R$ - радиус шара

$1{,}5R$ - до центра от оси вращ.

$tg\,\alpha = \frac{3}{2}$

N_1 - ?

N_2 - ?



$$\sin^2\alpha = \frac{\sin^2\alpha}{\sin^2\alpha + \cos^2\alpha} = \frac{1}{1+\frac{1}{tg^2\alpha}} = \frac{1}{1+\frac{1}{\frac{9}{4}}} =$$

$$= \frac{1}{1+\frac{4}{9}} = \frac{9}{13} \qquad \sin\alpha = \frac{3\sqrt{13}}{13}$$

$$\cos\alpha = \frac{2\sqrt{13}}{13}$$

1) 2-ой з-н Ньютона для шара в 1 вопросе:

$$N_1 + \underbrace{\frac{4}{3}\pi R^3 \rho g}_{\substack{F_a \\ \shortparallel \\ V\rho g}} = \underbrace{\frac{4}{3}\pi R^3 6\rho g}_{\substack{mg \\ \shortparallel \\ V\cdot 6\rho g}} \qquad N_1 = \frac{4}{3}\pi R^3 \cdot 5\rho g$$

$$\boxed{N_1 = \frac{20}{3}\pi R^3 \rho g}$$

и

2) Ось x - от шарика к оси вращения

2ой з-н Ньютона на x:

$$\cancel{m\omega^2 \cdot 1{,}5R = N_3 \sin\alpha}$$

$$\cancel{\frac{4}{3}\pi R^3 6\rho\,\omega^2 \frac{3}{2} R = N_3 \frac{3\sqrt{13}}{13}}$$

$$\cancel{4\pi R^3 \rho\,\omega^2 R = \frac{N_3}{\sqrt{13}} \Rightarrow N_3 = 4\sqrt{13}\,\pi R^4 \rho\,\omega^2}$$

$$\cancel{м^4 \cdot \frac{кг}{м^3} \cdot \frac{рад}{с^2}}$$

2ой з-н Ньютона на y:

$N_2 +$

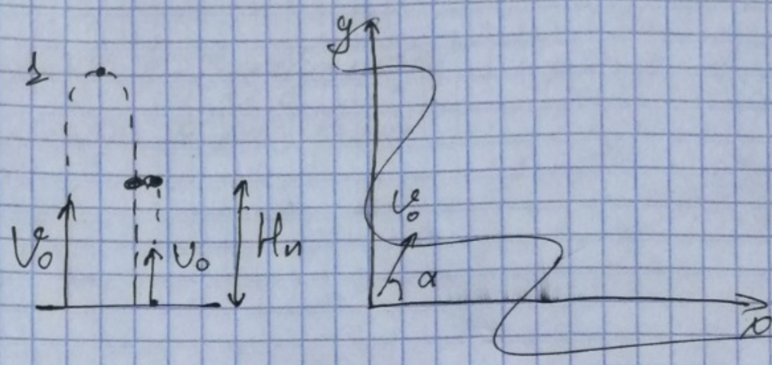
№1 Чистовик

v_0;

$t_{1п}$ - ?

$\frac{t_{1п}}{t_{2п}}$ - ?

H_c - ?



$$\begin{cases} \tau = \frac{v_0}{g} \\ H_п = v_0 \underset{t_2}{\underset{\shortparallel}{t_{2п}}} - \frac{g t_2^2}{2} \\ H_п = v_0 t_{1п} - \frac{g t^2}{2} \end{cases}$$

$t_1 = t_2 + \frac{v_0}{g}$ $\qquad \frac{t_1}{t_2} = \frac{\frac{3v_0}{2g}}{\frac{v_0}{2g}} = 3$

$$\begin{cases} H_п = \frac{v_0^2}{g} + \frac{v_0}{} t_2 - \frac{g}{2} t_2^2 - \frac{g}{2}\frac{v_0}{g}\cdot 2t_2 - \frac{g}{2}\frac{v_0^2}{g^2} \\ H_п = v_0 t_2 - \frac{g t_2^2}{2} \end{cases}$$

$$\frac{v_0^2}{g} + \cancel{v_0 t_2} - \cancel{\frac{g}{2} t_2^2} - v_0 t_2 - \frac{v_0^2}{2g} = v_0 t_2 - \cancel{\frac{g t_2^2}{2}}$$

$\frac{v_0^2}{2g} = v_0 t_2$ $\qquad t_2 = \frac{v_0}{2g}$

$t_1 = \tau + t_2 = \frac{v_0}{2g} + \frac{v_0}{g} = \frac{3v_0}{2g} = t_1$

$$H_п = v_0 \cdot \frac{v_0}{2g} - \frac{g}{2} \cdot \frac{v_0^2}{4g^2} = \frac{v_0^2}{g}\left(\frac{1}{2} - \frac{1}{8}\right) = 0{,}375\frac{v_0^2}{g}$$

$H_п = \frac{3}{8}\frac{v_0^2}{g}$ Ответ: 1) $t_1 = \frac{3v_0}{2g}$; 2) $3 = \frac{t_1}{t_2}$; 3) $H = \frac{3}{8}\frac{v_0^2}{g}$

$v_0 - gt = gt \Rightarrow t = \frac{v_0}{2g}$

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

$$d(tg\alpha) = \frac{1}{\cos^2\alpha}\, d\alpha$$

$$\cancel{d(1-tg\alpha)}$$

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

$$d\left(\frac{1}{\sin\alpha}\right) = \frac{0\sin\alpha - \cos\alpha}{\sin^2\alpha} = -\frac{\cos\alpha}{\sin^2\alpha}$$

$$d\left(\sin^2\frac{\alpha}{2}\right) = 2\sin\frac{\alpha}{2}\, d\frac{\alpha}{2}$$

$$\int \sin^2\alpha$$

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

$$= \frac{2\sin\alpha\cos^2\alpha - \sin^3\alpha}{\cos^2\alpha}$$

$$d\left(\frac{\sin^3\alpha}{\cos\alpha}\right) = \cancel{3\sin\alpha\sin^2\alpha}$$

$$= \frac{3\sin\alpha\cos\alpha(-\cos\alpha) - 2(1-\sin^2\alpha)\cos\alpha}{\cos^2\alpha}$$

$$d(\sin 2\alpha) = 2\cos 2\alpha\, d\alpha = 2(1-\sin^2\alpha)\, d\alpha$$

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Часть 2

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

Шифр: **21205861**

ID профиля: **202658**

Вариант 2

Чистовик   Вариант №02

№5

$i = 3$

$\frac{\Delta P}{P} = \frac{1}{1000}$ газ одноатомный

$P \to 0{,}999P$

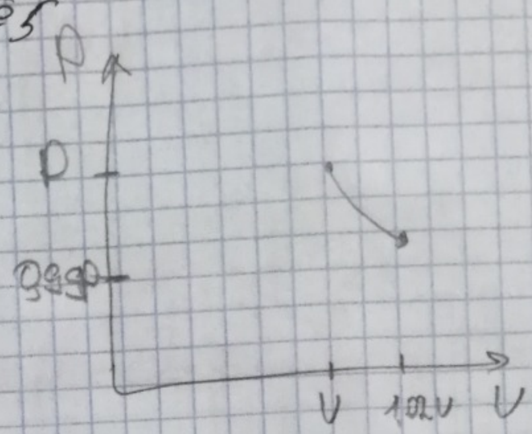
$V \to 1{,}02V$

$\frac{\Delta P}{P} \ll 1 \quad \frac{\Delta T}{T} \ll 1$

$\frac{\Delta V}{V} \ll 1$

ΔT — ?

$\frac{Q_+}{\Delta U}$ — ?



$PV = \nu R T_1$

дифференцируем

$d(PV) = d(\nu R T)$

$\cancel{P\Delta V + \Delta P \cdot V = \nu R \Delta T}$

$P dV + dP \cdot V = \nu R\, dT$

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

$P\left(\frac{2}{100} V\right) + \left(-\frac{1}{100}\right) P V = \frac{PV}{T_1} dT$

$\frac{dT}{T_1} = \frac{2}{100} - \frac{1}{100} = \frac{1}{100} \Rightarrow T_2 - T_1 = \Delta T = \frac{1}{100} T_1$

Увеличилась T на 1%

$\Delta U = \frac{i}{2} \nu R \Delta T = \frac{i}{2} \frac{PV}{T_1} \Delta T = \frac{iPV}{200}$

$Q_+ = \Delta U + \delta A$

$\frac{Q_+}{\Delta U} = \frac{\Delta U + \delta A}{\Delta U} = 1 + \frac{\delta A}{\Delta U}$

$\delta A = \frac{P + 0{,}999P}{2} \cdot \frac{V}{100} = \frac{0{,}995}{100} PV$

$\frac{Q_+}{\Delta U} = 1 + \frac{\frac{0{,}995 PV}{100}}{\frac{iPV}{200}} = 1 + \frac{1{,}99}{i} = \frac{i + 1{,}99}{i} = \frac{3 + 1{,}99}{3} = \frac{4{,}99}{3} = 1{,}6633(3)$

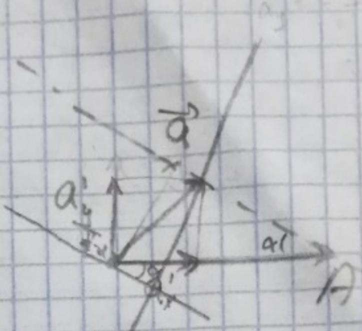
Ответ: 1) $\frac{Q_+}{\Delta U} = 1{,}66(3) = \frac{4{,}99}{3}$; 2) $\Delta T = 1\%$ увелич.

1

Чистовик

$2mA = mg - 4m(a_x' - a_y' - g)$

$$\begin{cases} 2A = 4a_y' + 4g - 4a_x' \\ A = \frac{3}{4}a_y' + a_x' \quad \Big| \cdot 4 \end{cases}$$



$$\begin{cases} 4A = 3a_y' + 4a_x' \quad \Big| + \\ 2A = 4a_y' + 4g - 4a_x' \end{cases}$$

$6A = 7a_y' + 4g$

$\cancel{a_y}\ a_y' = 6A - 4g$

$$\begin{cases} m(6A - 4g) = \frac{3}{5}N - mg \quad \Big| \cdot \frac{5}{3} \\ 2mA = mg - \frac{4}{5}N \quad \Big| \cdot \frac{5}{4} \end{cases}$$

$$\begin{cases} \frac{5}{3}m(6A - 4g) = N - \frac{5}{3}mg \quad \Big| + \\ \frac{5}{2}mA = \frac{5}{4}mg - N \end{cases}$$

$10mA - \frac{20}{3}mg + \frac{5}{2}mA = \frac{5}{4}mg - \frac{5}{3}mg$

$\frac{5}{2}A = \frac{1}{4}g - \frac{1}{3}g + \frac{4}{3}g = g\frac{5}{4}$

$\frac{1}{4} - \frac{1}{3} + \frac{4}{3} = \frac{1}{4} + 1 = \frac{5}{4}$

$\frac{5}{2}A = \frac{5}{4}g \Rightarrow A = \frac{g}{2}$

$\cancel{A}\ a_y' = \cancel{6A-4} \Rightarrow 6 \cdot \frac{g}{2} - 4g = -g$

$3g$

$a_x' = A - \frac{3}{4}(-g) = \frac{g}{2} + \frac{3}{4}g = \frac{5}{4}g$

$-H = \frac{a_y'}{2}\tau_2^2 \Rightarrow +H = \frac{+g}{2}\tau_2^2 \Rightarrow \tau_2 = \sqrt{\frac{2H}{g}}$

Чистовик

№ 4

~~2т-ыная~~

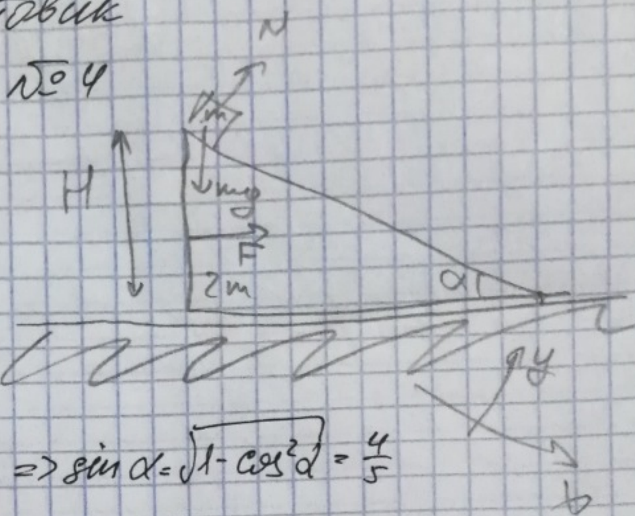
$m; H; \cos\alpha = \frac{3}{5}$

$F = mg$

$\tau_1 - ?$

$A - ?$

$\tau_2 - ?$



$\cos\alpha = \frac{3}{5} \Rightarrow \sin\alpha = \sqrt{1-\cos^2\alpha} = \frac{4}{5}$

2ой з-н Ньютона на x:

$mg\sin\alpha = ma \Rightarrow a = g\sin\alpha = \frac{4}{5}g$

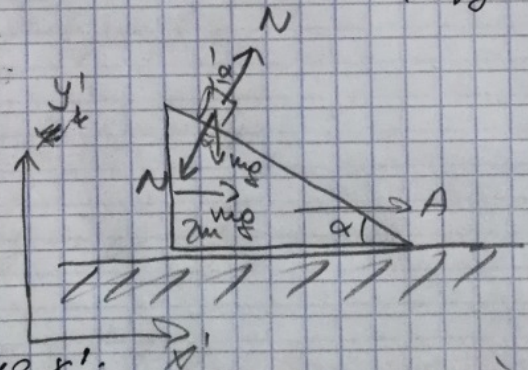
$\frac{H}{\sin\alpha} = L = a\frac{\tau_1^2}{2} = g\sin\alpha\frac{\tau_1^2}{2}$

$H\frac{5}{4} = \frac{4}{5}g\frac{1}{2}\tau_1^2 \Rightarrow \tau_1^2 = \frac{25}{8}\frac{H}{g}$

$\tau_1 = \frac{5\sqrt{2}}{4}\sqrt{\frac{H}{g}}$

$\tau_1 = \sqrt{\frac{2H}{g\sin^2\alpha}}$

2)

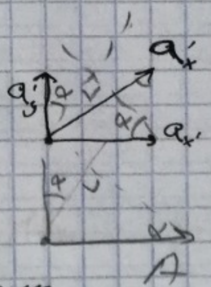


2ой з-н Ньютона на x':

$2mA = mg + (-N)\sin\alpha$

$y': \; m a'_y = -mg + N\cos\alpha$

$m a'_x = N\sin\alpha$



На ось y' ускорения и ск. бр. и клина должны быть одинаковыми:

$A\sin\alpha = a'_y\cos\alpha + a'_x\sin\alpha$

$$\begin{cases} A = \frac{3}{4}a'_y + a_x \\ 2mA = mg - \frac{4}{5}N \\ m a'_y = -mg + \frac{3}{5}N \\ m a'_x = \frac{4}{5}N \end{cases} \quad \Big| \quad \begin{matrix} m(a'_x - a'_y) = mg + \frac{N}{5} \\ \frac{4}{5}N = 4m(a'_x - a'_y - g) \end{matrix}$$

Продолжение № 5 Чистовик

$PV = \nu R T_1$

$0{,}99P \cdot 1{,}0\cancel{1}2V = \nu R T_2$

$\frac{T_2}{T_1} = \frac{0{,}99 \cdot 1{,}02}{1} = 1{,}0098$

$T_2 = 1{,}0098\, T_1$

$N = 0{,}98\,\% \uparrow$

$\frac{Q_+}{\Delta U} - ?$

$Q_+ = \Delta A + \Delta U$

$\Delta A = \frac{P + 0{,}99P}{2} \cdot 0{,}02V = \frac{(P+0{,}99P)V}{100} =$

$= \frac{1{,}99}{1\cancel{200}} PV$

$\Delta U = \frac{i}{2} \nu R \Delta T$

Ответ: 1) $\Delta T = 0{,}98\,\%$; 2)

$\Delta T = \frac{\Delta(PV)}{\nu R} =$

$\Delta T = 0{,}0098T$

$\Delta U = \frac{i}{2} \nu R\, 0{,}0098T = \frac{0{,}0098i}{2} PV$

$\frac{Q_+}{\Delta U} = \frac{0{,}0049 \cdot i\, PV + \frac{1{,}99}{1200} PV}{i \cdot 0{,}0049 PV} =$

Ответ: 1) $\Delta T = 0{,}98\,\%$, увелич. 2) $\frac{Q_+}{\Delta U} \approx 2{,}3537415$ $= \cancel{1{,}676870748299932} = \frac{346}{147}$

$\frac{Q_+}{\Delta U} = \cancel{310} \frac{i \cdot 0{,}0049 + 0{,}0199}{i \cdot 0{,}0049} = \frac{49i + 199}{49i} = 2{,}3537415$

$\frac{Q_+}{\Delta U} = \frac{346}{147}$

$$\begin{cases} A\sin\alpha = a'_y\cos\alpha + a'_x\sin\alpha \\ 2mA = mg - N\sin\alpha \\ ma'_y = -mg + N\cos\alpha \\ ma'_x = N\sin\alpha \end{cases}$$

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

$\cos\alpha = \frac{3}{5}$

$A = \frac{13}{66}g$

$a'_y = -\frac{6}{11}g$

$a'_x = \frac{20}{33}g$

$$\begin{cases} A = \frac{3}{4}a'_y + a'_x \\ 2mA = mg - \frac{4}{5}N \\ ma'_y = -mg + \frac{3}{5}N \\ ma'_x = \frac{4}{5}N \end{cases}$$

$ma'_y = -mg + \frac{3}{4}ma'_x$

$$\begin{cases} a'_y = -g + \frac{3}{4}a'_x \\ A = \frac{3}{4}a'_y + a'_x \\ 2A = g - a'_x \end{cases}$$

$3A = g + \frac{3}{4}a'_y$

$N = \frac{5}{4}\cdot m\frac{20}{33}g = \frac{25}{33}mg$

$a'_x = g - 2A = g - 2\cdot\frac{13}{66}g = \frac{20}{33}g$

$A = \frac{3}{4}\left(-g + \frac{3}{4}(g - 2A)\right) + g - 2A$

$A = -\frac{3}{4}g + \frac{9}{16}g - \frac{9}{8}A + g - 2A$

$3A + \frac{9}{8}A = g + \frac{9}{16}g - \frac{3}{4}g$

$\frac{33}{8}A = \frac{13}{16}g \Rightarrow A = \frac{13}{66}g$

$\frac{3}{4}a'_y = \cancel{\frac{13}{33}g}\ \frac{13}{22}g - g = \frac{13-22}{22}g = -\frac{9}{22}g$

$a'_y = -\frac{6}{11}g$

$-\frac{6}{11}g\frac{\tau_2^2}{2} = -H \Rightarrow \tau_2 = \sqrt{\frac{11H}{3g}}$

в 1ом случае

Ответ: 2) $A = \frac{13}{66}g$; 3) $\tau_2 = \sqrt{\frac{11H}{3g}}$ 1) $\tau_1 = \frac{5\sqrt{2}}{4}\sqrt{\frac{H}{g}}$

уск. кл.

во 2ом случае

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