

# Часть 1

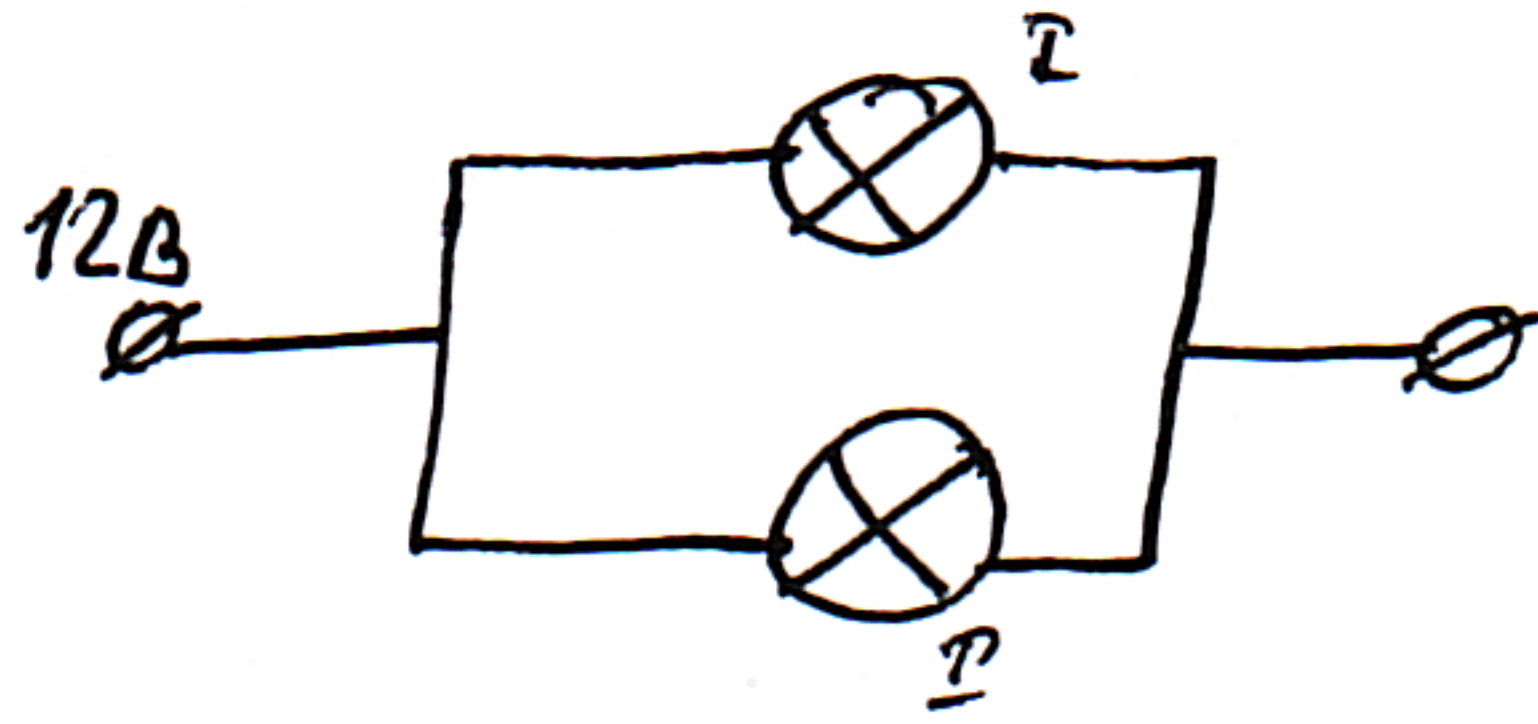
Олимпиада: **Физика, 9 класс (1 часть)**

Шифр: **21205435**

ID профиля: **208845**

Вариант 1

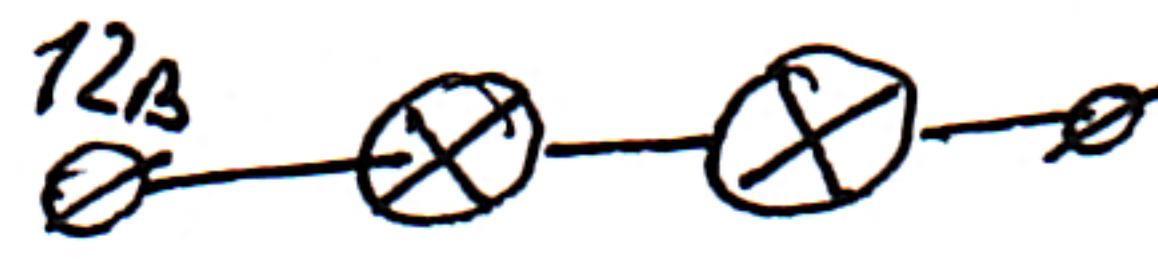
№ 3



$$P_1 = 20 \text{ Вт}$$

$$I = \frac{P}{U}$$

$$1) I = \frac{20}{12} = 1\frac{2}{3} \text{ А}$$

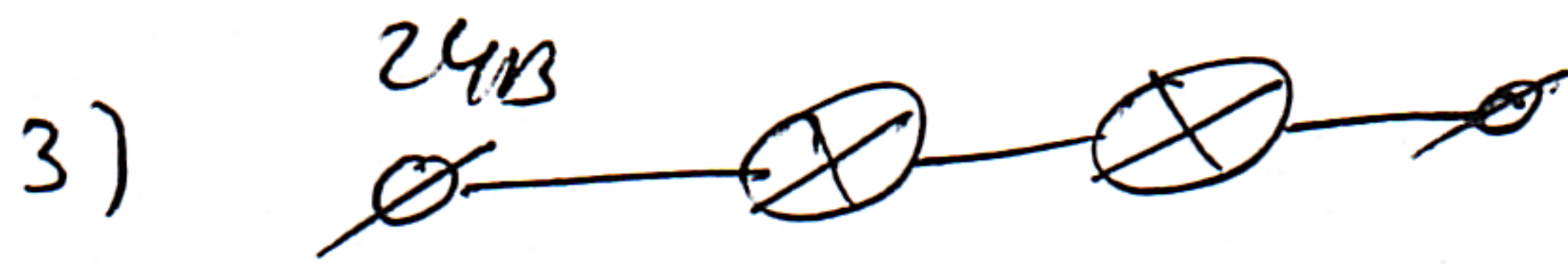


$$P_2 = 6,6 \text{ Вт}$$

$$2) I_1 = \frac{6,6}{12} = 0,55 \text{ А}$$

$$I_1 = \frac{U}{R}$$

$$R = 12 \cdot \frac{20}{11} = \frac{240}{11}$$



$$R = \frac{240}{11}$$

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

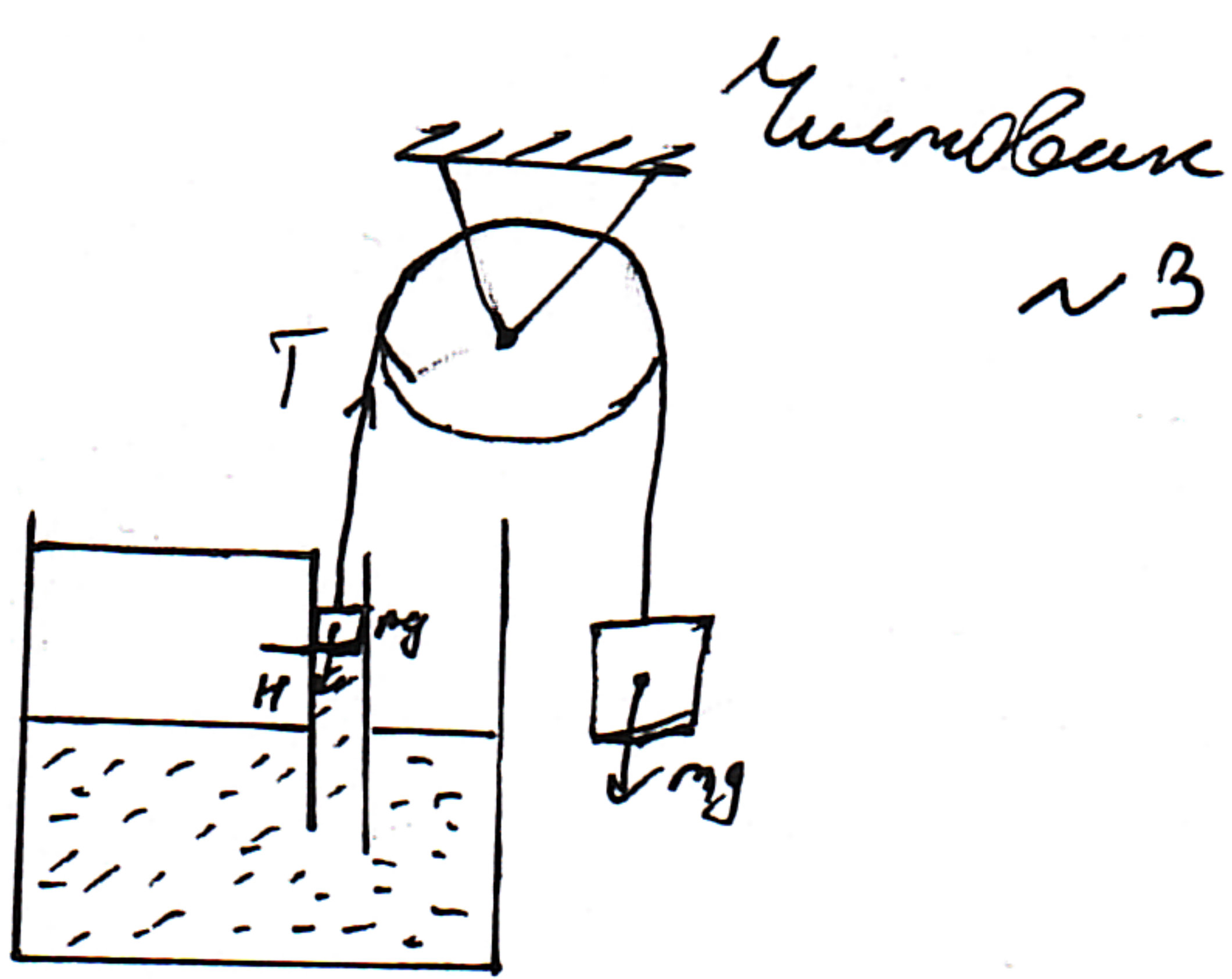
$$I = \frac{24}{\frac{240}{11}} = \frac{24 \cdot 11}{240} = 1,1 \text{ А}$$

$$P = 24 \cdot 1,1 = 26,4 \text{ Вт}$$

Ответ: 1)  $I = 1\frac{2}{3} \text{ А}$ , 2)  $I_1 = 0,55 \text{ А}$ , 3)  $P = 26,4 \text{ Вт}$ .

②





$$1) P = \rho \cdot g \cdot h \cdot \rho = 1000 \text{ Па}$$

$$2) m = \rho \cdot V, m_B = \rho \cdot V = \rho \cdot 0,0008 \cdot 0,1 = 1000 \cdot 0,0008 \cdot 0,1 = 0,08 \text{ кг}$$

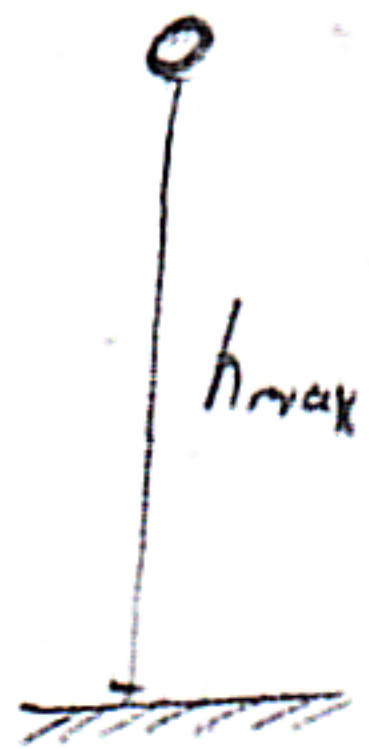
$$m_1 = m + m_B = 1302$$

$$3) h = \frac{m + 120 - m_1}{\rho \cdot g \cdot \rho} = \frac{40}{1000 \cdot 10 \cdot 0,0008} = 5 \text{ см}$$

Оубем: 1)  $P = 1000 \text{ Па}$ , 2)  $m = 1302$ , 3)  $h = 5 \text{ см}$



# Упробене

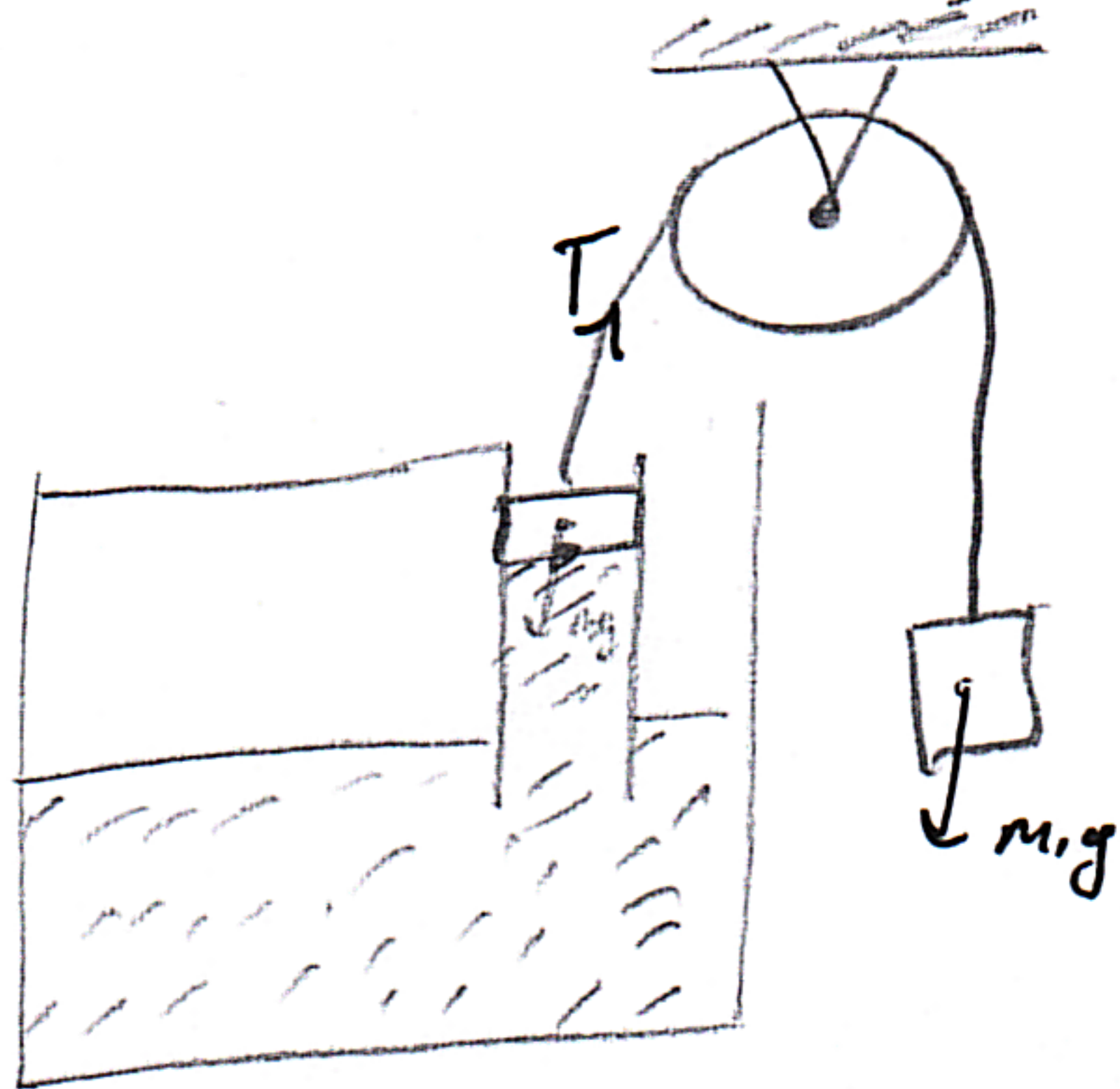


$$\frac{V_0}{g} \cdot 0,5V_0 = \frac{V_0^2}{2g} - h_{max}$$

$$t = \frac{V_0 - t \cdot g + V_0}{2} = t(V_0 - 5t)$$

$$2 \cdot \frac{V_0 + V_0 - 2 \cdot g}{2}$$

$$\frac{S_1}{S_2} = \frac{t(V_0 - 5t)}{t(5t) + \frac{V_0^2}{2g}} = \frac{V_0 - 5t}{5t + \frac{V_0^2}{2g}} = \frac{t(V_0 - 5t)^2}{5t^2 + \frac{V_0^2}{2g}}$$



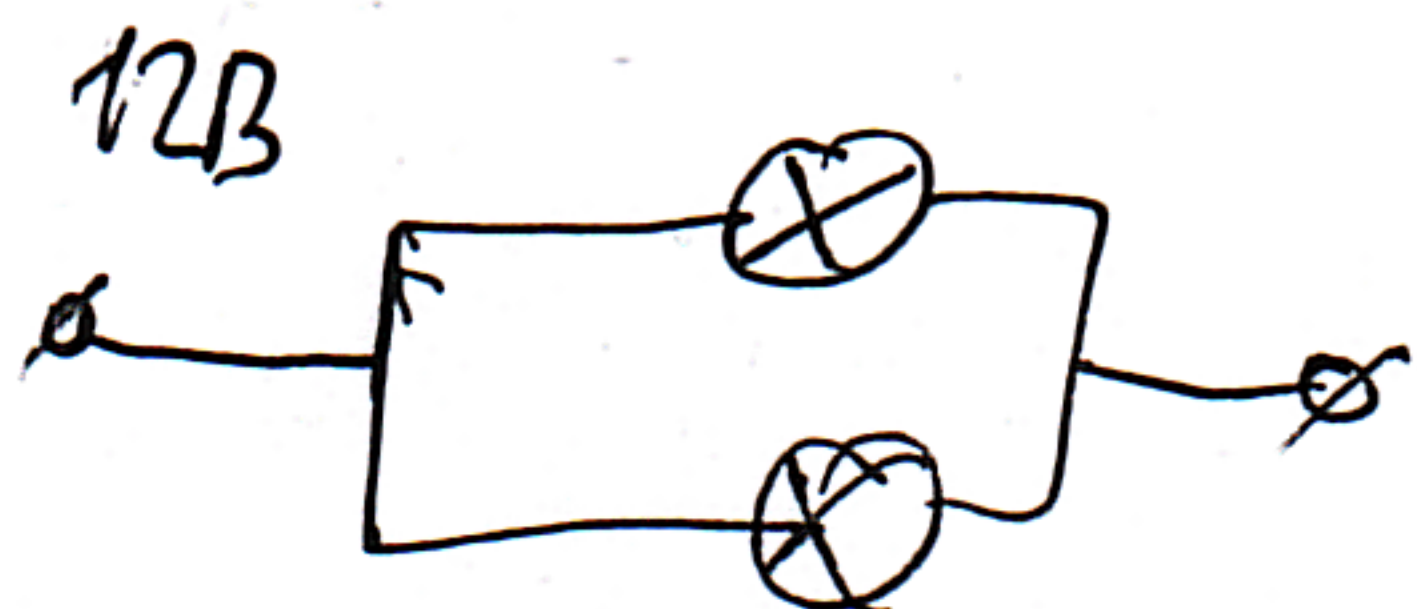
$$S = 0,0008 \text{ m}^2 \quad m = 0,05 \text{ kg}$$

$$P = 625 \text{ Па}$$

$$1000 \cdot 10 \cdot 0,1 = 1000 \text{ Па}$$

$$M_B = 0,0008 \cdot 1000 \cdot 1000 = 802$$

$$A = I \cdot U \cdot t$$



$$P_1 = 20 \text{ Вт}$$

$$I = 1 \frac{2}{3} \text{ А}$$



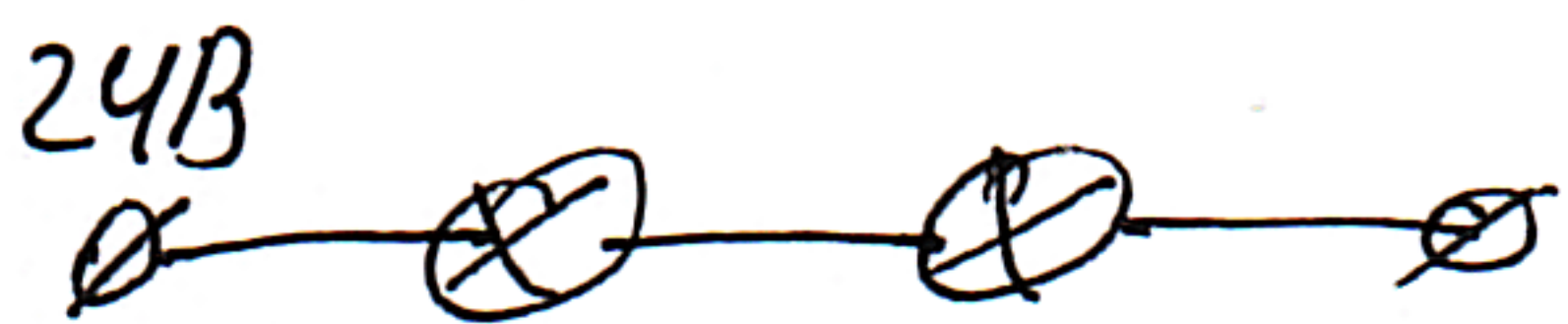
$$P_2 = 6,6 \text{ Вт}$$

$$I = 0,55 \text{ А}$$

$$0,55 = \frac{12}{R}$$

$$R =$$

$$12 : 55 \cdot 100 = 12 \cdot \frac{100}{55} = 12 \cdot \frac{20}{11}$$



$$P = \frac{U}{I} I \cdot U \quad P = \frac{24}{0,55} \cdot 24 \cdot 0,55 = 13,2 \text{ Вт}$$

$$R = \frac{240}{11}$$

$$I = \frac{24}{\frac{240}{11}} = \frac{24 \cdot 11}{240} = 1,1 \text{ А}$$

$$P = 24 \cdot 1,1 = 26,4 \text{ Вт}$$



~1

1) П.к. изначальные скорости мячей равны, но после столкновения первый не взлетит выше чем был уже был.

$$h_{\max} = \frac{V_0^2}{2g}$$

$$2) h_{\text{cm}} = \tau \cdot \frac{V_0 + (V_0 - \tau \cdot g)}{2} = \tau (V_0 - 5\tau)$$

$$3) S_1 = h_{\max} + \tau \cdot \frac{0 + g\tau}{2} = \frac{V_0^2}{2g} + \tau \cdot 5\tau$$

$$S_2 = \tau (V_0 - 5\tau)$$

$$\frac{S_1}{S_2} = \frac{\frac{V_0^2}{2g} + 5\tau^2}{\tau (V_0 - 5\tau)}$$

$S_1$  - путь первого мяча

$S_2$  - путь второго мяча

$$\text{Ответ: } h_{\max} = \frac{V_0^2}{2g}, h_{\text{cm}} = \tau (V_0 - 5\tau), \frac{S_1}{S_2} = \frac{\frac{V_0^2}{2g} + 5\tau^2}{\tau (V_0 - 5\tau)}.$$



# Часть 2

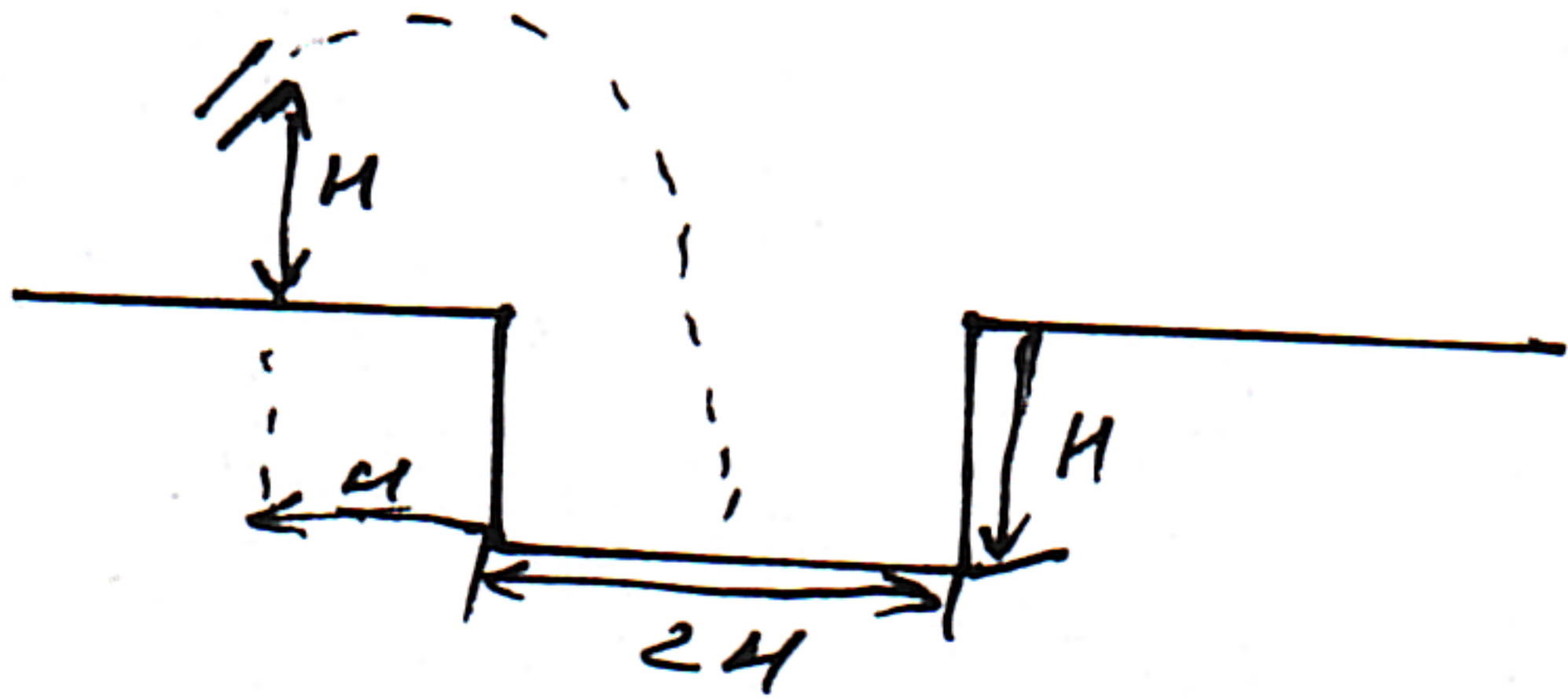
Олимпиада: **Физика, 9 класс (2 часть)**

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ID профиля: **208845**

Вариант 1





$$1) V_{down} = \sqrt{H^2 \cdot H} = \sqrt{H^3}$$

$$t = \frac{V_{down}}{S \cdot V} \quad t = \frac{\sqrt{H^3}}{S \cdot \sqrt{g H}}$$

$$2) 1 + t g^2 L = \frac{1}{\left(\frac{H}{\sqrt{2 H^3}}\right)^2}$$

$$1 + t g^2 L = \frac{1}{\frac{H^2}{2 H^3}}$$

$$1 + t g^2 L = 2$$

$$t g^2 L = 1$$

$$t g L = 1 \vee t g L = -1$$

$$3) 1 + t g^2 L = \frac{1}{\frac{(3H)^2}{10H^3}}$$

$$1 + t g^2 L = \frac{10}{3}$$

$$t g^2 L = \frac{7}{3}$$

$$t g L = -\frac{7}{3} \vee t g L = \frac{7}{3}$$

$$\text{Type } t g L \in \left[-\frac{7}{3}; -1\right] \cup \left[1; \frac{7}{3}\right]$$

Orubem: 1)  $t = \frac{\sqrt{H^3}}{S \sqrt{g H}}$ , 2)  $t g L = \pm 1$ , 3)  $t g L \in \left[-\frac{7}{3}; -1\right] \cup \left[1; \frac{7}{3}\right]$

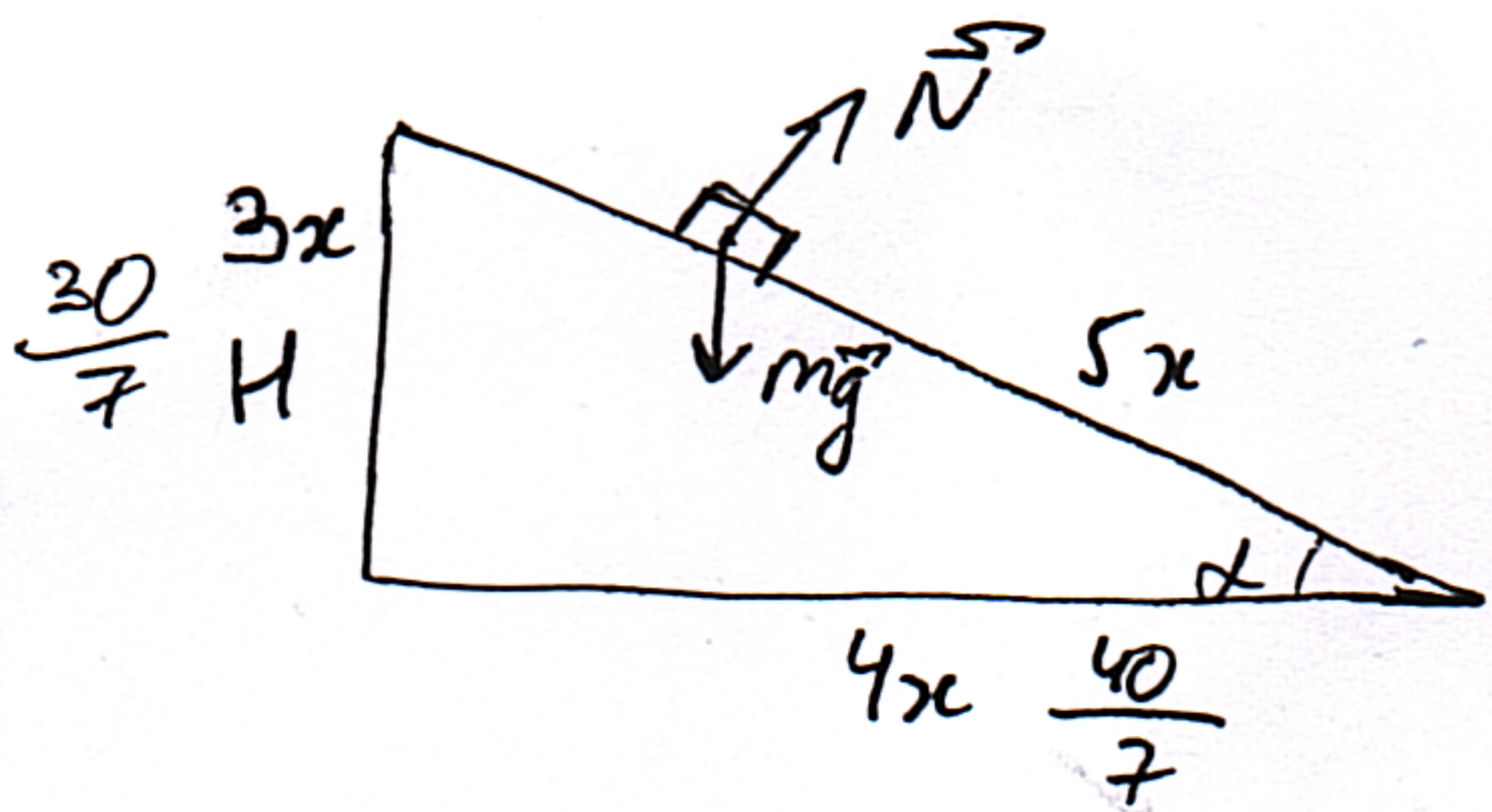


Чертков

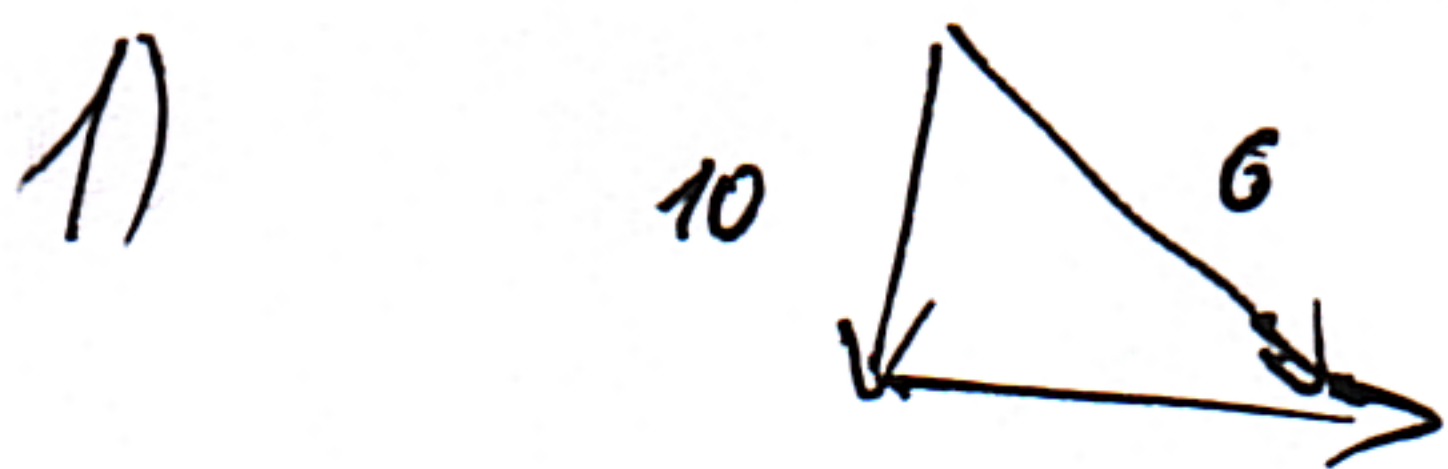
$$\sqrt{R^2}$$

$$\frac{\sqrt{H^2 \cdot H}}{\int \sqrt{0.5gH^1}}$$

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



1+



$$5x - 3t = 3x - 2t$$

$$\sqrt{16x^2 + 4^2} =$$

$$25x^2 = 16x^2 + 4^2$$

$$9x^2 = 4^2$$

$$4 = 3x$$

$$\sin \alpha = 3/5$$

$$\frac{3x}{2t} = \frac{5x}{3t}$$

$$1 + \tan^2 \alpha = \frac{1}{\left(\frac{4}{\sqrt{24x^2}}\right)^2}$$

$$1 + \tan^2 \alpha = \frac{1}{\frac{16x^2}{24x^2}}$$

$$1 + \tan^2 \alpha = 2 \cdot \frac{24x^2}{16x^2}$$

$$\tan^2 \alpha = 1$$

$$\tan \alpha = 1$$

$$1 + \tan^2 \alpha = \frac{1}{\frac{3x^2}{10x^2}}$$

$$1 + \tan^2 \alpha = \frac{10}{3}$$

$$\tan^2 \alpha = \frac{7}{3}$$

$$\tan \alpha = \pm \sqrt{\frac{7}{3}}$$

$$\frac{1}{34}$$

$$1 + \tan^2 \alpha = \frac{1}{\left(\frac{\sqrt{24x^2}}{\sqrt{24x^2}}\right)^2}$$

$$\tan \alpha =$$

$$\tan \alpha = 4/3$$

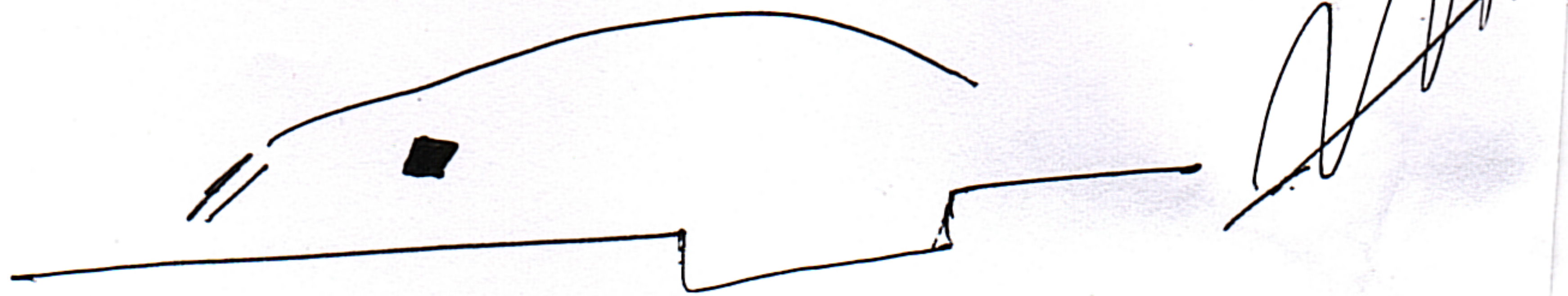
$$1 + \tan^2 \alpha = \frac{1}{\frac{16x^2}{24x^2}}$$

$$\frac{20}{15t} = \frac{4x \cdot 20}{20t}$$

$$\frac{20x}{15t} = \frac{20x}{20t}$$

$$1 + \tan^2 \alpha = \frac{2}{11}$$

$$\tan \alpha = \sqrt{1 + \frac{2}{11}}$$

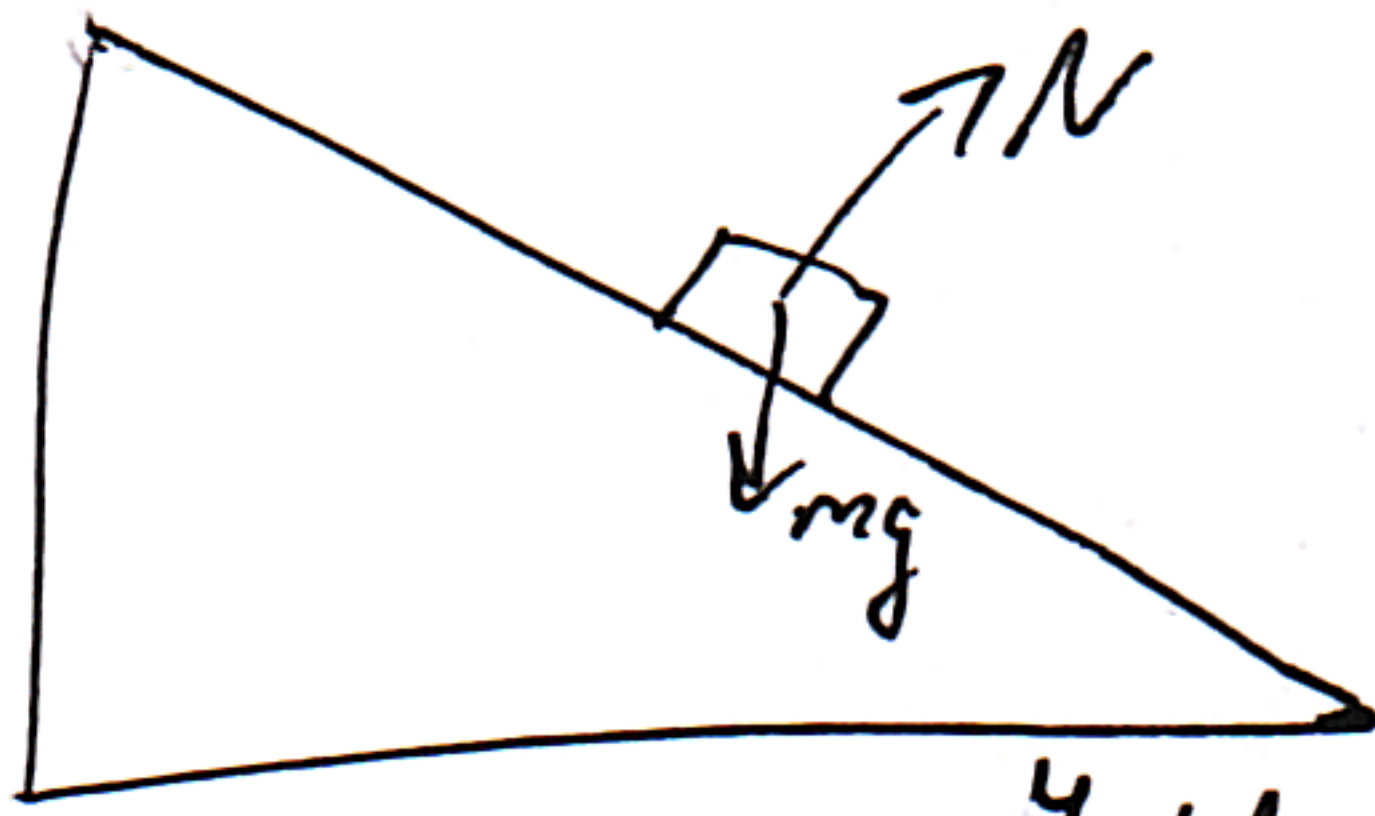




$$\frac{H \cdot 7}{15 \cdot t} = t$$

$$H \cdot 7 = 15 t^2$$

$$1) \quad t = \sqrt{\frac{7}{15} H}$$



$$2) \quad \frac{40}{21} \quad \frac{40}{21}$$

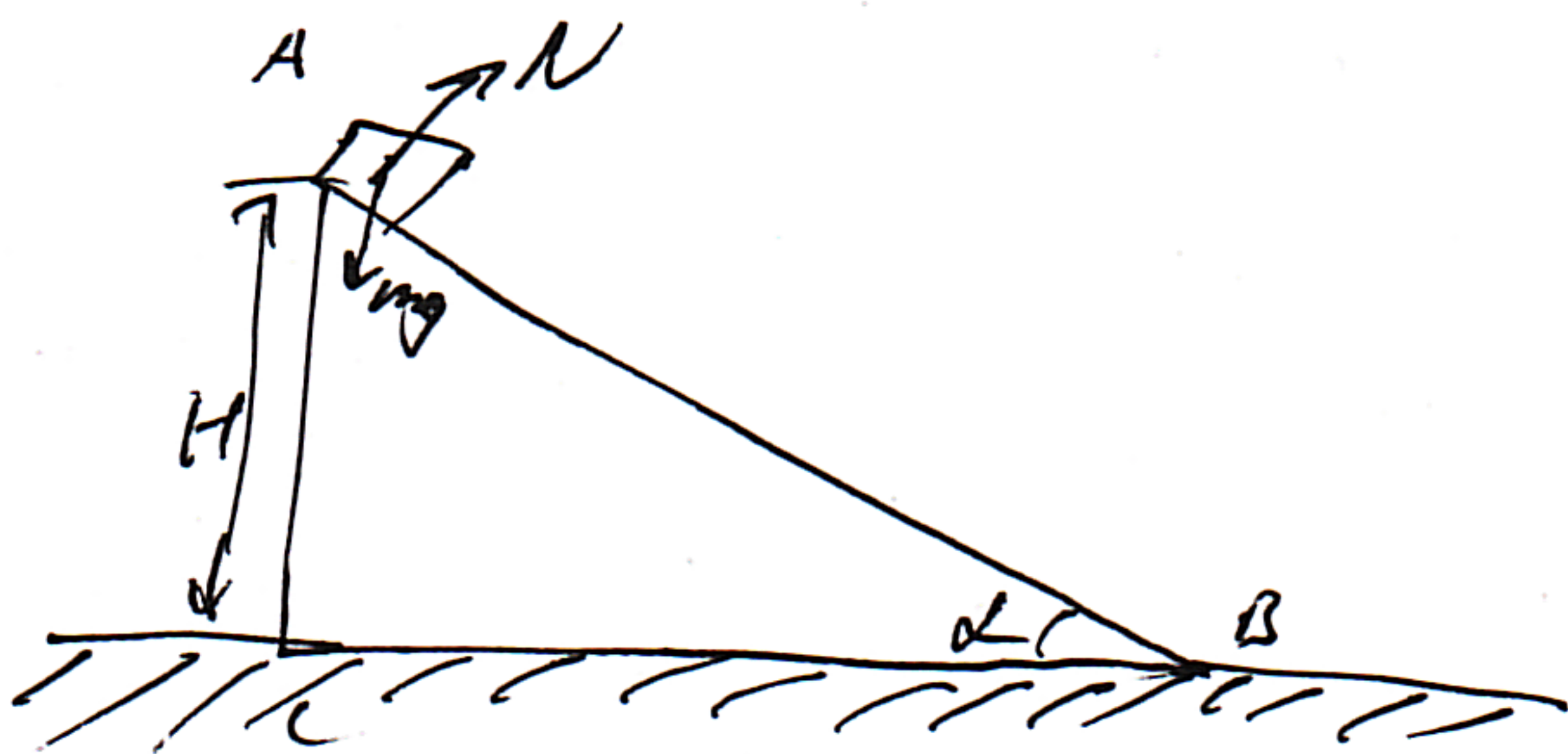
$$\frac{40}{21} + \frac{120}{21} = \frac{160}{21} = a_{\text{net}}$$

$$\frac{\frac{4}{3} H \cdot 21}{80 \cdot t} = t$$

$$28 H = 80 t^2$$

$$3) \quad t = \sqrt{\frac{28}{80} H} = \sqrt{\frac{7}{20} H}$$





1)  $\cos \alpha = 4/5 \Rightarrow BC = 4x, AB = 5x$

$\downarrow$   
 $AC = 3x$  (Европейский метод.)

$\downarrow$   
 $\sin \alpha = 3/5$

$a_{\text{г}} = g \cdot \frac{3}{4+3} = \frac{30}{7}$

$\frac{H}{0 + \frac{30}{7}t} = t$

$\frac{7H}{15t} = t \quad | \cdot 15t$

$15t^2 = 7H$

$t = \sqrt{\frac{7}{15}H} \quad (c)$

2)  $a_{\text{гклин}} = \frac{g \cdot \frac{4}{4+3}}{3} = \frac{40}{21} \text{ (м/с}^2\text{)}$

3)  $a_{\text{об}} = \frac{40}{21} + \frac{100}{21} = \frac{160}{21}$

$\frac{\frac{4}{3}H - 21}{80t_1} = t_1$

$28H = 80t_1^2$

$t_1 = \sqrt{\frac{7}{20}H}$

Ответ:  $t = \sqrt{\frac{7}{15}H} \text{ (c)}, a_{\text{клин}} = \frac{40}{21} \text{ (м/с}^2\text{)}, t_1 = \sqrt{\frac{7}{20}H} \text{ (c)}$ .

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