



## Открытая региональная межвузовская олимпиада вузов Томской области (ОРМО)

Общий балл	Дата	Ф.И.О. членов жюри	Подписи членов жюри
20+20+16+6 62/658		Воронцов А.А.	А Воронцов

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Дано:

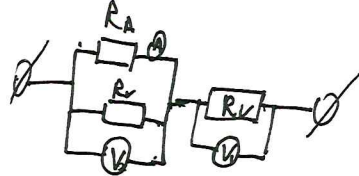
$$I_1 = 0,2 \text{ mA}$$

$$U_1 = 1,5 \text{ B}$$

$$U_2 = 0,3 \text{ B}$$

 $R_V \text{ и } R_A$ 

$$R_{\text{экв}} = \frac{R_A \cdot R_V}{R_A + R_V}$$



$$I_1 = 0,2 \text{ mA} = 0,0002 \text{ A}$$

$$R_A = \frac{U_2}{I_1} = 1500 \text{ Ом} = 1,5 \text{ кОм}$$

$$I = \frac{U_1}{R_V}$$

$$I = \frac{U_2}{R_{\text{экв}}} = \frac{U_2 \cdot (R_A + R_V)}{R_A \cdot R_V}$$

$$\frac{U_1}{R_V} = \frac{U_2 \cdot (R_A + R_V)}{R_A \cdot R_V}$$

$$U_1 R_A = U_2 R_A + U_2 R_V$$

$$\frac{R_A (U_1 - U_2)}{U_2} = R_V$$

$$R_V = \frac{U_2 (U_1 - U_2)}{I_1 - U_2} = \frac{U_1 - U_2}{I_1} = 6000 \text{ Ом} = 6 \text{ кОм}$$

Ответ:  $R_A = 1,5 \text{ кОм}$ ;  $R_V = 6 \text{ кОм}$ .

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Дано:

Колити:

 $L_x$ 

$$L_x = L \cdot x$$

$$m \cdot 4L \cdot g + m \cdot 3L \cdot g + m \cdot 2L \cdot g + m \cdot L \cdot g = 2m \cdot 2L \cdot g + 3L \cdot m \cdot g + m \cdot L \cdot x \cdot g$$

$$10 \cdot m \cdot L \cdot g = (x+7) \cdot m \cdot L \cdot g \quad | : m \cdot L \cdot g$$

$$7+x=10$$

$$x=3$$

$$L_x = 3L$$

Ответ: груз можно повесить на 2 страница врючок №3. ✓

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$$m = V \cdot \rho$$

$$Q = cm(t_m - t_0) \#$$

$$V = 1,5 \text{ дм}^3 = 0,0015$$

$$m = V \cdot \rho = 1,5 \text{ кг}$$

$$Q = cm(t_m - t_0) = 535500 \text{ Дж}$$

$$P_2 = P_1 - q = 750 \text{ Вт}$$

$$P = \frac{Q}{T} \Rightarrow Q = P \cdot T$$

$$Q = P_1 \cdot T_x + P_2 \cdot (T - T_x)$$

$$P_1 T_x - P_2 T_x = Q - P_2 T$$

$$T_x = \frac{Q - P_2 T}{P_1 - P_2} = \frac{53500 - 5170500}{50} = 360 \text{ с}$$

Дано:

$$V_0 = 1,5 \text{ дм}^3$$

$$P_1 = 0,8 \text{ кВт} = 800 \text{ Вт}$$

$$T = 11,5 \text{ мин} = 690 \text{ с}$$

$$q = 50 \text{ Вт}$$

$$t_0 = 10^\circ \text{C}$$

$$t_m = 95^\circ \text{C}$$

$$\rho = 1000 \frac{\text{кг}}{\text{дм}^3}$$

$$c = 4200 \frac{\text{Дж}}{\text{кг} \cdot ^\circ \text{C}}$$

$$t_x$$

$$Q_1 = P_1 \cdot T_x = 288000 \text{ Дж}$$

$$Q_1 = cm(t_x - t_0)$$

$$t_x = \frac{Q_1}{cm} + t_0 = 55,7^\circ \text{C}$$

$$\text{Ответ: } t_x = 55,7^\circ \text{C}$$

$$Q_2 = P_2 \cdot (T - T_x) = 247500 \text{ Дж}$$

$$Q_2 = cm(t_m - t_x)$$

$$t_x = t_m - \frac{Q_2}{cm} = 55,7^\circ \text{C}$$

5.

Дано:

$$t_1 = 3 \text{ с}$$

$$t_2 = 1,32 \text{ с}$$

$$L_1 = L_2 = L_3$$

$$L_3$$

$$v_1 = v_0 + at_1$$

$$v_2 = v_1 + at_2 = v_0 + a(t_1 + t_2)$$

$$v_3 = v_2 + at_3 = v_0 + a(t_1 + t_2 + t_3)$$

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

$$a = \frac{v_3 - v_2}{t}$$

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

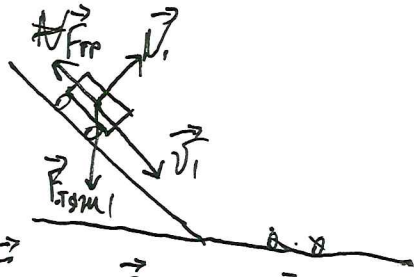
$$L = v_0 + \frac{at_1^2}{2}$$

$$L = v_1 + \frac{at_2^2}{2}$$

$$L = v_2 + \frac{at_3^2}{2}$$

68.

2.



$$\vec{F}_4 \cdot t + \vec{F}_3 \cdot t = \vec{F}'_4 \cdot t + \vec{F}'_3 \cdot t$$

$$F_4 = \alpha m_4 \quad F_3 = 0 \quad F_4' = F_3' = F_{4;3}$$

$$F_4 \cdot t + F_3 \cdot t = F_{4;3} \cdot t \cdot 2$$

$$\vec{F}_{\text{тп}} + \vec{N}_1 + \vec{F}_{\text{тгм}} = m \vec{a}$$

$$O_x: \sin \alpha \cdot F_{\text{тгм}} - F_{\text{тп}} = m \alpha$$

$$O_y: N_1 - \cos \alpha \cdot F_{\text{тгм}} = 0$$

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Дано:

$$m_2 = m_1 \cdot 110\%$$

$$m_3 = m_2 \cdot 110\%$$

$$m_4 = m_3 \cdot 110\%$$

Sid

 $v_n$