

Общий балл	Дата	Ф.И.О. Жюри	Подпись
	10.03.21	Евдок Д.М.	
		Шифр	

Задача 1.

$$1) R = \frac{V_0^2 \sin(2\alpha)}{g}$$

$$R_1 = \frac{V_0^2 \sin(2\alpha)}{g}$$

$$R_2 = \frac{V_0^2 \sin(2(90^\circ - \alpha))}{g} = \frac{V_0^2 \sin(180^\circ - 2\alpha)}{g} = \frac{V_0^2 \sin(2\alpha)}{g}$$

$$K = \frac{R_1}{R_2} = 1$$

$$2) H = \frac{V_0^2 \sin^2 \theta}{2g}$$

$$H_1 = \frac{V_0^2 \sin^2 \alpha}{2g}$$

$$H_2 = \frac{V_0^2 \sin(90^\circ - \alpha)}{2g} = \frac{V_0^2 \cos^2 \alpha}{2g}$$

$$N = \frac{H_1}{H_2} = \frac{\sin^2 \alpha}{\cos^2 \alpha} = \tan^2 \alpha$$

Задача 2

$$1) \vec{N}_1 + \vec{N}_2 + \vec{N}_3 + \vec{P} = 0$$

$$N_1 - mg = 0 \Rightarrow N_2 = N_3$$

$$M_F + M_F + M_F = 0$$

$$2) (N_2 x_2 + N_3 x_3 = mg x_p) \quad N_2 = N_3 = N$$

$$N(x_2 + x_3) = mg x_p$$

$$N = \frac{mg}{L} \left| \frac{L}{2} - a \right|$$

$$N_2 = N_3 = \frac{mg}{L} \left| \frac{L}{2} - a \right|$$

$$\begin{cases} N_1 - mg = 0 \\ N_2 - N_3 = 0 \end{cases}$$

$$\frac{1}{2} \left| \frac{1}{3} \right| \frac{1}{5} \left| \frac{1}{7} \right| \frac{1}{9}$$

$$3) S = \frac{2\sqrt{2} V_0^2 \sin \alpha (\cos \alpha - \sin \alpha)}{g}$$

$$4) \left(\sin \frac{\pi}{4} \cos x - \cos \frac{\pi}{4} \sin x \right) \sin x$$

$$2\sqrt{2} (\cos x - \sin x) (\sin x)$$

?

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Задача.

$$C_1 = 4200 \frac{\text{Дж}}{\text{кг} \cdot ^\circ\text{C}}$$

$$C_2 = 2100 \frac{\text{Дж}}{\text{кг} \cdot ^\circ\text{C}}$$

$$1) Q_1 = m_1 C_1 (0 - (-10)) = 0,9 \cdot 4200 \cdot 10 = 37800 \text{ Дж}$$

$$2) Q_2 = m_2 C_2 (0 - (-10)) = 0,9 \cdot 2100 \cdot 10 = 18900 \text{ Дж}$$

$$3) Q_3 = m_3 C_3 T = 0,9 \cdot 4200 \cdot T = 3780 T \text{ Дж}$$

$$Q = 18900 + 3780 T = 3780 T + 18900$$

$$Q = m_1 C_1 (90 - T) = 4200 (90 - T)$$

$$Q = 4200 \cdot (90 - 0) = 378000 \text{ Дж}$$

$$N \cdot (3780 T + 18900) \leq 4200 (90 - T)$$

$$4200 (90 - T) = 3780 T + 18900$$

$$378000 - 4200 T = 3780 T + 18900$$

$$378000 - 18900 = 4200 T + 3780 T$$

$$59400 = 7980 T$$

$$T = \frac{59400}{7980} = 7,44^\circ\text{C}$$

Ответ: $N=1$

$$T \approx 7,44^\circ\text{C} / 12$$

Задача 4

$$R_1 = I^2 R_1$$

$$R_2 = I^2 R_2$$

$$\frac{R_1}{R_2} = \frac{R_1}{R_2} = 16$$

$$R_1 = 16 R_2$$

$$\frac{R_1}{R_2} = 16$$

$$\frac{S_2}{S_1} = \frac{1}{2}$$

$$\frac{I_1}{I_2} = 16 \cdot \frac{1}{2} = 8$$

Температура первого участка T_1 равен $8 T_2$, где T_2 температурного участка.