

$$1. m \vec{v}_0 = m \vec{v}_1 + m \vec{v}_2$$

$$\vec{v}_0 = \vec{v}_1 + \vec{v}_2$$

$$\frac{m v_0^2}{2} = \frac{m v_1^2}{2} + \frac{m v_2^2}{2}$$

$$v_0^2 = v_1^2 + v_2^2$$

$$\text{Маяғы: } 90^\circ$$

$$2. \epsilon = 3$$

$$m/k: \frac{P_{\text{ш}}}{S_c} = ?$$

$$F = mg$$

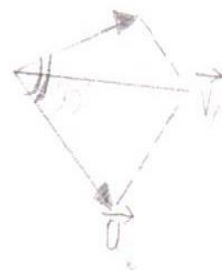
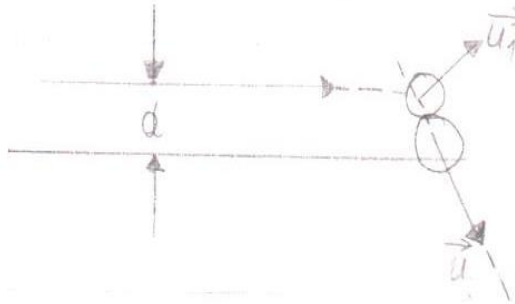
$$mg = \frac{F_k}{\epsilon} + F_A$$

$$F_A = mg \frac{\epsilon - 1}{\epsilon}$$

$$m = \rho V \quad F_A = \rho g V$$

$$\rho g \frac{m}{\rho V} = mg \frac{\epsilon - 1}{\epsilon} \Rightarrow \frac{P_{\text{ш}}}{S} = \frac{\epsilon}{\epsilon - 1}$$

$$\frac{P_{\text{ш}}}{S_c} = \frac{3}{3-1} = 1.5$$



3. Тегі:

$$R = 40 \text{ Ом}$$

$$U = 220 \text{ В}$$

$$N_m = 300 \text{ Вт}$$

$$N_{\text{max}} = ?$$

Менші:

$$N = U^2 / R$$

$$N = 220^2 / 40 = 1210 \text{ Вт}$$

$$N > N_1 (1210 > 300)$$

$$N = U^2 / R$$

$$U = \sqrt{NR}$$

$$\text{Түр кезегіне } U \neq \sqrt{NR}$$

$$\sqrt{NR} = U - \epsilon U$$

$$N_{\text{max}} = U^2 - \epsilon^2 R$$

$$N_{\text{max}} = \frac{U^2 - \epsilon^2 R}{1 - \epsilon^2} = \frac{220^2 - 4 \cdot 40}{1 - 16} = 605$$

4. Тегі:

$$T_1 = 70^\circ \text{C}$$

$$T_2 = 35^\circ \text{C}$$

$$t = ?$$

Менші:

$$Q_1 = Q_2$$

$$c_1 m_1 (T_1 - t) = c_2 m_2 (t - T_2)$$

$$(T_1 - t) = 2 R_1 c_1 S_1 (t - T_2)$$

$$T_1 - t = 4t - 4T_2$$

$$Q_1 + 4Q_2 = 5t$$

$$t = \frac{Q_1 + 4Q_2}{5} = \frac{70 + 4 \cdot 35}{5} = \frac{70 + 140}{5} = \frac{210}{5} = 42^\circ \text{C}$$

Ф - 10 - 02

Қатысушының шешімдерін толтыруға арналған өріс / Поле для заполнения решений участника

Парақ / Страница №

N1

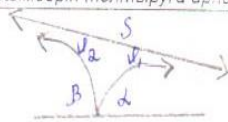
$$\alpha = 30^\circ$$

$$v_1 = 24 \text{ м/с}$$

$$B = 60^\circ$$

$$v_2 = 32 \text{ м/с}$$

$$S = ?$$



$$x_1 = \frac{2v_1 \sin \alpha}{g} = \frac{2 \cdot 24 \cdot \frac{1}{2}}{g} = \frac{24}{g}$$

$$x_2 = \frac{2v_2 \sin B}{g} = \frac{2 \cdot 32 \cdot \frac{\sqrt{3}}{2}}{g} = \frac{32\sqrt{3}}{g}$$

$$x_1 = v_1 \cos \alpha t$$

$$y_1 = v_1 \sin \alpha t - \frac{gt^2}{2}$$

$$x_2 = v_2 \cos B t$$

$$y_2 = v_2 \sin B t - \frac{gt^2}{2}$$

$$S = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$S = \sqrt{(v_1 \cos \alpha t - v_2 \cos B t)^2 + (v_1 \sin \alpha t - v_2 \sin B t)^2} =$$

$$= \sqrt{(t(v_1^2 \cos^2 \alpha + v_2^2 \cos^2 B)) + (t(v_1^2 \sin^2 \alpha + v_2^2 \sin^2 B))} = t \sqrt{v_1^2 (\cos^2 \alpha + \sin^2 \alpha) + v_2^2 (\cos^2 B + \sin^2 B)} =$$

$$= t \sqrt{v_1^2 + v_2^2} = t \sqrt{24^2 + 32^2} = t \sqrt{1600} = 40t$$

$$S = 1,5 \sqrt{1600} = 1,5 \cdot 40 = 60 \text{ м}$$

N2

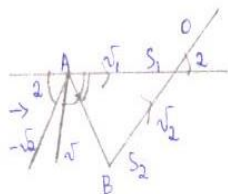
$$\alpha = 30^\circ$$

$$v_1 = 10 \text{ м/с}$$

$$v_2 = 17,3 \text{ м/с}$$

$$S_1 = 200 \text{ м}$$

$$m/k: S_2 = ?$$



$$v = \sqrt{v_1^2 + v_2^2 - 2v_1 v_2 \cos \alpha} = \sqrt{100 + 299,29 - 2 \cdot 10 \cdot 17,3 \cdot \frac{\sqrt{3}}{2}} = \sqrt{100} = 10 \text{ м/с}$$

$$B = 90^\circ - \alpha = 60^\circ$$

$$S_2 = 0$$

$$S_2 = \frac{S_1}{2 \cos \alpha} = \frac{200}{2 \cdot \frac{\sqrt{3}}{2}} = \frac{200}{\sqrt{3}} = 115,5 \text{ м}$$

N3

$$i = 3$$

$$v_2 = \cos \theta$$

$$P = 11 P_0$$

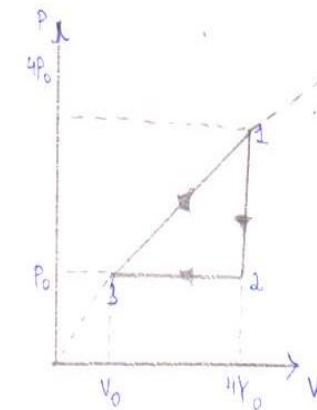
$$v_3 < v_2$$

$$T_3 = T_1$$

$$\frac{P_3}{v_3} = \frac{P_1}{v_1}$$

$$v_3 = v_0$$

$$v_1 = 4v_0$$



$$\eta = \frac{A}{Q} 100\% = \frac{q_1 - q_2}{q_1} 100\% = 15\%$$

N4

$$R_1 = 3 \text{ см}$$

$$R_2 = 20 \text{ см}$$

$$q_1 = 14 \text{ нКл}$$

$$q_2 = -7 \text{ нКл}$$

$$m/k: q_1 = ?$$

$$k = \frac{q_1}{R_1} = k \frac{q_2}{R_2}$$

$$q = q_1 + q_2 = 14 + (-7) = 7 \text{ нКл}$$

$$q' = q_1 + q_2 \quad q' = q - q_2$$

$$q_2' = \frac{q \cdot R_2}{R_1 + R_2}$$

$$q_2' = \frac{7 \cdot 20}{3 + 20} = \frac{140}{23} = 6,1 \text{ нКл}$$

$$q_1' = 7 - 6,1 = 0,9 \text{ нКл}$$

Парақтың артқы жағын толтырмаңыз / Обратную сторону листа не заполнять

90-11-01

Қатысушының шешімдерін толтыруға арналған өріс / Поле для заполнения решений участника

Парақ / Страница №

1) Бер:

$$\alpha = 30^\circ$$

$$v_1 = 10 \text{ м/с}$$

$$v_2 = 17,3 \text{ м/с}$$

$$S_1 = 100 \text{ м}$$

$$S_2 = ?$$

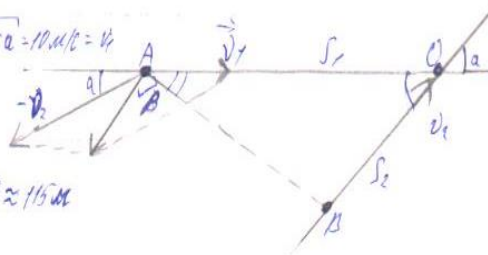
Шешуі:

$$v_{\text{ср}} = \sqrt{v_1^2 + v_2^2} = 2v_1 \cos \alpha = 10 \text{ м/с} = v_1$$

$$\beta = 90^\circ - 2\alpha = 30^\circ = \alpha$$

$$S_2 = S_1 / \cos \alpha = 100 / 0,5 = 200 \text{ м}$$

Жауабы: 200 м



2) Бер:

$$C_1 = 3 \text{ мкФ}, q = 3 \cdot 10^{-6} \text{ Кл}$$

$$C_2 = 6 \text{ мкФ}, q = 6 \cdot 10^{-6} \text{ Кл}$$

$$C_3 = 10 \text{ мкФ}, q = 10 \cdot 10^{-6} \text{ Кл}$$

$$E = 10 \text{ В}$$

$$C = ?$$

Шешуі:

$$C_3 = E, q_3 = C_3 E = 10^{-4} \text{ Кл}$$

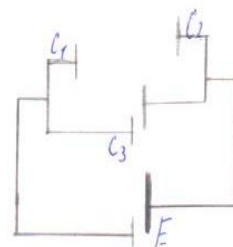
C_1, C_2 - бірлесіп

$$\frac{q}{C_1} + \frac{q}{C_2} = E$$

$$q_1 = q_2 = q = \frac{C_1 C_2}{C_1 + C_2} E = \frac{3 \cdot 10^{-6} \cdot 6 \cdot 10^{-6}}{3 \cdot 10^{-6} + 6 \cdot 10^{-6}} \cdot 10 = 2 \cdot 10^{-5} \text{ Кл}$$

$$C = C_3 + \frac{C_1 C_2}{C_1 + C_2} = 10 + \frac{3 \cdot 10^{-6} \cdot 6 \cdot 10^{-6}}{3 \cdot 10^{-6} + 6 \cdot 10^{-6}} = 12 \cdot 10^{-6} \text{ Ф} = 12 \text{ мкФ}$$

Жауабы: 12 мкФ



3) Бер:

$$t = 27^\circ \text{C}$$

$$\rho = 5 \cdot 10^5 \text{ Па}$$

$$m = 2 \text{ кг}$$

$$V = 8 \text{ см}^3$$

$$A = 1,4 \cdot 10^3 \text{ Дж} = 1,4 \cdot 10^6 \text{ Дж}$$

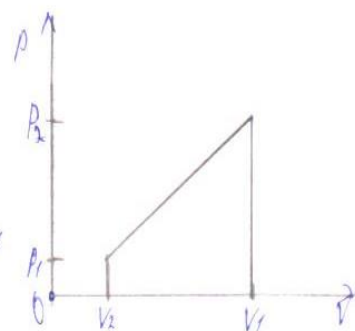
$$V_1 = ?$$

$$A = \frac{p_1 + p_2}{2} \cdot (V_1 - V_2)$$

$$p_1 V_1 = p_2 V_2, V_1 = \frac{p_2 V_2}{p_1}$$

$$A = \frac{p_1 + p_2}{2} \cdot \left(V_1 - \frac{p_2 V_2}{p_1} \right)$$

$$M = \frac{9,31 \cdot 300 \cdot 2}{5 \cdot 10^5 \cdot 21} = \frac{4986}{10,5 \cdot 10^5} = 0,00474 \text{ кг} = 4,74 \text{ г}$$



4) Бер:

$$m = 2 \text{ кг}$$

$$S = 5 \text{ см}^2$$

$$\rho(\text{жыл}) = 1000 \text{ кг/м}^3$$

$$v = ?$$

Шешуі:

$$F = mg$$

$$F = \Delta x$$

$$\Delta F = \rho g S \Delta x$$

$$v = 1/2 \sqrt{2gh} = 1/2 \sqrt{2 \cdot 10 \cdot 10} = 5 \text{ м/с}$$

Жауабы: 5 м/с

Парақтың артқы жағын толтырмаңыз / Обратную сторону листа не заполнять

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
БІЛІМ ЖӘНЕ ҒЫЛЫМ МИНИСТРЛІГІ
«Дарын» РЕСПУБЛИКАЛЫҚ ҒЫЛЫМИ, ТРАКТИКАЛЫҚ ОРТАЛЫҒЫ
РЕСПУБЛИКАЛЫҚ МЕМЛЕКЕТТІК ҚАЗЫНАЛЫҚ ҚИСПОРНІ