

1. Demo:
 $L = 30^\circ = \frac{\pi}{6} \text{ рад};$
 $\beta = 60^\circ = \frac{\pi}{3} \text{ рад};$
 $v_1 = 24 \text{ м/с};$
 $v_2 = 32 \text{ м/с};$
 $t = 1.5 \text{ с};$
 $d = ?$

Решение: $d = \sqrt{d_x^2 + d_y^2}; d_x = |S_{x1} + S_{x2}|;$
 $d_y = |S_{y2} - S_{y1}|; S_{x0} = v \cdot \cos \theta \cdot t; d_x = |v_1 \cdot \cos \alpha + v_2 \cdot \cos \beta|;$
 $S_{y0} = v \cdot \sin \theta \cdot t - \frac{gt^2}{2}; S_{y1} \approx 7 \text{ м}; S_{y2} \approx 30.6 \text{ м};$
 $d_y = |30.6 - 7| = 23.6 \text{ м}; d_x = |31.176 + 24| = 55.176 \text{ м}$
 $d = \sqrt{55^2 + 23.6^2} \approx \sqrt{3025 + 557} \approx 60 \text{ м}$

Ответ: $d = 60 \text{ м}$

2. Demo:

$R_1 = 8 \cdot 10^2 \text{ м};$
 $R_2 = 20 \cdot 10^2 \text{ м};$
 $q_1 = 14 \cdot 10^{-9} \text{ Кл};$
 $q_2 = -7 \cdot 10^{-9} \text{ Кл};$
 $q_1' = ?; q_2' = ?$

$Q = q_1 + q_2 = 7 \cdot 10^{-9} \text{ Кл}; V = \varphi_1' - \varphi_2' = 0; \frac{kq_1'}{\epsilon_0 R_1} = \frac{kq_2'}{\epsilon_0 R_2};$
 $q_1' = \frac{R_1}{R_2} q_2' = 0.4 q_2'; q_1' + q_2' = Q; q_2' = 5 \cdot 10^{-9} \text{ Кл};$
 $q_1' = 2 \cdot 10^{-9} \text{ Кл};$

2. Demo:

$i = 3; a) V = \text{const}; T \downarrow; P = \frac{1}{4} P_0; b) P = \text{const}; V \downarrow; c) P \sim V; \eta = ?$

$\eta = \frac{Q_n}{Q_z}; \frac{PV}{T} = \text{const}; a) \frac{P_{0a}}{T_{0a}} = \frac{P_0}{T_0}; R_{0a} = T_{0a} = \frac{P_{0a}}{P_0} \cdot T_0 = \frac{1}{4} P_0; T_{0a} = \frac{1}{4} T_0; V_{0a} = V_0;$

b) $\frac{V_b}{T_b} = \text{const}; P_b = P_{0a}; V_b = \frac{1}{4} V_{0a}; T_b = \frac{1}{4} T_{0a}; P_b = P_{0a} = \frac{1}{4} P_0;$

c) $P_c = P_0 = 4 P_{0a} (P_{0a} = P_b); V_c = V_0 = 4 V_b \Rightarrow V_b = \frac{1}{4} V_0;$

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