

Решение

1. 3.C.Э. $\frac{mU^2}{2} = \frac{kA^2}{2}; \quad U = A\sqrt{\frac{k}{m}}.$

I $U_I = 2\text{М/с}.$

II $U_{II} = 1\text{М/с}.$

2. $m\omega_1^2 l_0 = \mu mg; \quad m\omega_2^2 2l_0 = \mu mg + kl_0;$
 $m(2\omega_2^2 - \omega_1^2) = k; \quad \omega = 2\pi n; \quad k = 4\pi^2 m(2n_2^2 - n_1^2).$

I $k_I = 182 \text{ Н/м}.$

II $k_{II} = 553 \text{ Н/м}.$

3. $V_2 = nV_0; \quad V_3 = nV_0; \quad P_2 = P_0; \quad P_3 = nP_0; \quad PV = \nu RT.$
 $Q = Q_{12} + Q_{23} = \nu C_p(T_2 - T_1) + \nu C_v(T_3 - T_2) = \frac{\nu RT}{2}(3n^2 + 2n - 5).$

I $Q_I = 24,8 \text{ кДж}.$

II $Q_{II} = 5,4 \text{ кДж}.$

4. $\frac{mU^2}{R} = eUB; \quad l = \frac{U^2}{2a_\tau} = \frac{mU^2}{2eE} = \frac{eB^2 R^2}{2Em}.$

I $l_I = 19,8 \text{ см}.$

II $l_{II} = 117 \text{ см}.$

5.
$$U \cos \alpha = \left(\frac{f}{d} \right)^2 U \cos \alpha \left. \vphantom{U \cos \alpha} \right\} \quad U = \frac{F^2}{(f-F)^2} U \quad \text{не зависит от угла!}$$

$$d = \frac{f \cdot F}{f-F}$$

I $U_I = 8 \text{ см/с}.$

II $U_{II} = 3 \text{ см/с}.$