

Fizika I - kolokvij 2 (31.1.2003) - Resitve

$$1) \quad A = \Delta W_{int} = m \cdot c_v (T_2 - T_1) = \frac{p_1 V_1 \mu}{RT_1} \cdot \frac{3R}{2\mu} (T_2 - T_1) =$$

$$= \frac{3}{2} p_1 V_1 \left(\left(\frac{V_1}{V_2} \right)^{\gamma-1} - 1 \right) = -78 \text{ kJ} \quad T_1 V_1^{\gamma-1} = T_2 V_2^{\gamma-1}$$

$$2) \quad l_0 = 2\pi \sqrt{\frac{J}{Mg \cdot r^*}} \quad r^* = \frac{m \frac{l}{2} + m \frac{l}{2} + m \frac{2l}{3}}{3m} = \frac{5}{9} l \quad M = 3m$$

$$l_0 = 1,49 \text{ s}$$

$$J = \frac{m l^2}{3} + m \left(\frac{l}{2} \right)^2 + \left(\frac{2l}{3} \right)^2 m = m l^2 \frac{37}{36}$$

$$3) \quad v_1 = v_0 \frac{1 + \frac{v}{c}}{1 - \frac{v}{c}} \quad v = c \cdot \frac{v_1 - v_0}{v_1 + v_0} = 15 \text{ m/s}$$

$$4) \quad W_k = \frac{J \omega^2}{2} \quad J = \int_0^l x^2 \rho \omega dx = 10,5 \text{ kg/m}^2$$

$$W_k = 4730 \text{ J}$$