

Answers Exam 3 2019

$$2. \quad ME = -\frac{CM}{3r^3} + \frac{CM}{2r^3} = \frac{1}{6} \frac{CM}{r^3}$$


$$3. \quad a) \quad \omega = \frac{m_1 s^2 \omega_0}{m_1 s^2 + m_2 (ct)^2}$$

$$b) \quad m_1 s^2 \omega_0 = m_1 s^2 \omega + m_2 s^2 \omega$$

$$\omega = \frac{m_1 s^2 \omega_0}{(m_1 + m_2) s^2}$$

$$c) \quad m_1 s^2 \omega_0 = m_1 s^2 \omega$$

$$\omega = \omega_0$$

4. 

$$\begin{cases} Mg - T = Ma_y \\ RT - P \cos \phi R = I \alpha \\ a_y = R \alpha \end{cases}$$

$$a_y = \frac{Mg - P \cos \phi}{\frac{I}{R^2} + M}$$

$$\omega = \int \alpha dt = \int \frac{a_y}{R} dt = \boxed{\frac{Mg - P \cos \phi}{R \left(\frac{I}{R^2} + M \right)} t}$$