

Answers Test 3 2010

$$2. a) \quad \omega = \frac{m_2 v_1 \cos \phi S - m_2 \frac{v_1}{2} S}{m_1 S^2}$$

$$b) \quad \omega = \frac{m_2 v_1 \cos \phi S - m_2 \frac{v_1}{2} S}{m_1 S^2 + \underline{I}}$$

$$3. a) \quad v_r(t) = -3h \sin \theta c_1 t^2$$

$$v_\theta(t) = 3h \cos \theta c_1 t^2$$

$$b) \quad \vec{r} = h \cos \theta F_\theta \vec{i}_\theta \text{ (out)}$$

$$F_\theta = m \left[-2h \sin \theta (3c_1 t^2)^2 + h \cos \theta \cdot 6c_1 t \right]$$

$$a = \frac{d\omega}{dt} = 6c_1 t$$

$$4. \quad v_{3x} = \frac{(m_1 + m_2 + m_3) v - m_2 v_2 \cos \theta}{m_3}$$

$$v_{3y} = \frac{m_1 v_1 - m_2 v_2 \sin \theta}{m_3}$$

$$\tan \phi = \frac{v_{3y}}{v_{3x}} = \frac{m_1 v_1 - m_2 v_2 \sin \theta}{(m_1 + m_2 + m_3) v - m_2 v_2 \cos \theta}$$