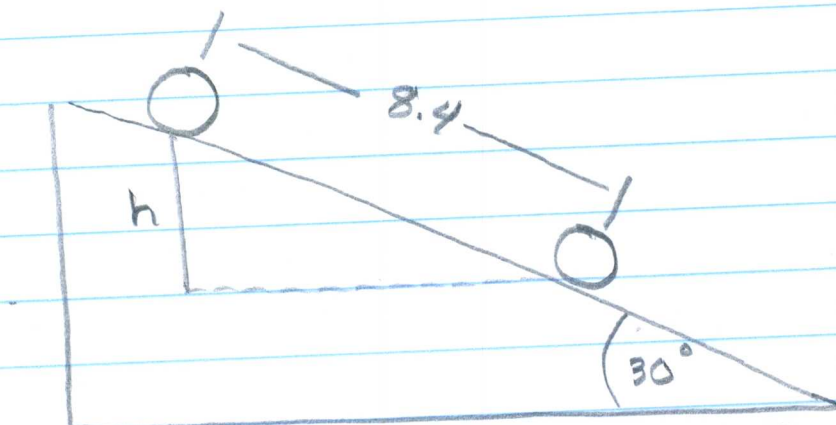


Chpt 12 # 54

54



$$\bullet h = 8.4 \sin 30^\circ = 4.2$$

• Use CONSERVATION OF ENERGY:

$$E_i = E_f$$

$$mgh = \frac{1}{2} m v_{cm}^2 + \frac{1}{2} I \omega^2$$

$$= \frac{1}{2} m v_{cm}^2 + \frac{1}{2} \left(\frac{2}{5} m R^2 \right) \left(\frac{v_{cm}}{R} \right)^2$$

$\underbrace{\hspace{10em}}_I \quad \underbrace{\hspace{10em}}_\omega$

$$\Rightarrow mgh = \frac{1}{2} m v_{cm}^2 + \frac{1}{5} m v_{cm}^2$$

$$\Rightarrow gh = \frac{7}{10} v_{cm}^2$$

$$\Rightarrow v_{cm} = \sqrt{\frac{10}{7} gh} = \sqrt{\frac{10}{7} (9.8) 4.2} = \boxed{7.7 \frac{m}{s}}$$