

Student Life Disability Services  
113 West 12th Ave  
033 Baker Hall  
Columbus, OH 43210

$$9.) D_1 = (2.2 - 0.27) = 1.93$$

$$\frac{V_{02}}{V_{01}} = \frac{D}{D_1} \rightarrow V_{02} = \frac{D}{D_1} V_{01}$$

$$I_2 = \frac{D}{D_1} I_1 \rightarrow \left( \frac{2.2}{1.93} \right) (1.10 \text{ cm})$$

$$\approx 1.25 \text{ cm}$$

11.) a.

$$10.) a. \frac{mgs \sin \theta}{1 + \frac{I}{R^2}} \rightarrow I = mR^2$$

$$a = \frac{gs \sin \theta}{1 + \frac{I}{R^2}} \rightarrow \frac{2gs \sin \theta}{3}$$

$$\rightarrow \frac{2}{3} \times 10 \times \sin(30) \rightarrow \underline{3.3 \text{ m/s}^2}$$

$$b. mgh = \frac{1}{2} mv^2 + \frac{1}{2} I \omega^2$$

$$\omega^2 = \frac{4gh}{3R^2} = \frac{4 \times 10 \times 3}{3(0.2)^2} \quad \omega^2 = 100 \frac{\text{rad}^2}{\text{s}^2}$$

$$\text{K.E. } \frac{1}{2} \omega^2 = \frac{1}{2} \frac{mR^2}{2} \omega^2 = \frac{mR^2 \omega^2}{4}$$

$$\text{K.E. } \frac{2(0.2)^2 \times 1000}{4} = \underline{20 \text{ J}}$$

$$12.) a. \frac{1}{2} (kx)x = mg(n + \frac{5}{k}) \quad \frac{1}{2} kx^2 \quad kx = 5$$

$$\rightarrow 12.5k = 0.5 \times 7 + \left( \frac{25}{k} \right)$$

$$\rightarrow \frac{10}{k} = 3.5$$

$$\rightarrow k = \frac{10}{3.5} = \underline{2.86 \text{ N/m}}$$

$$b) I = \int (kx) dt + M \sqrt{2g(n+m)}$$

$$I = \sqrt{\frac{kx^2}{mt^2}} \rightarrow m \sqrt{\frac{1}{2} k x^2} \quad x^2$$

$$c) u_1 = 0.3c \quad u_2 = -0.7c$$

$$\frac{u_2 - u_1}{1 - \frac{u_1 u_2}{c^2}} \rightarrow \frac{0.7c - 0.3c}{1 - (0.3c)(-0.7c)} \rightarrow \frac{-c}{1.21} \rightarrow \underline{0.86c}$$