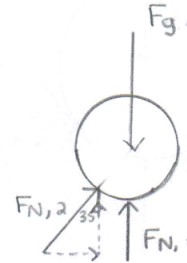
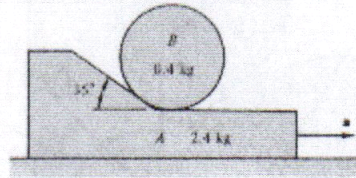


NORMAL FORCES

1. BODY A AND CYLINDER B MOVE IN RECTILINEAR TRANSLATION WITH AN ACCELERATION OF 2.7 m/s^2 .



- A. FIND THE FORCES EXERTED ON CYLINDER B BY BODY A.

$$\begin{aligned} \sum F_x &= F_{N,2} \sin \theta \\ F_{NET} &= F_{N,2} \sin \theta \\ m a_{NET} &= F_{N,2} \sin \theta \\ \frac{m a_{NET}}{\sin \theta} &= F_{N,2} \\ \frac{0.4 \text{ kg} (2.7 \text{ m/s}^2)}{\sin 35^\circ} &= F_{N,2} \\ 1.88 \text{ N} &= F_{N,2} \end{aligned}$$

$$\begin{aligned} \sum F_y &= F_{N,1} + F_{N,2} \cos \theta - F_g = 0 \\ F_{N,1} &= F_g - F_{N,2} \cos \theta \\ F_{N,1} &= 0.4 \text{ kg} - 1.88 \text{ N} \cos 35^\circ \\ F_{N,1} &= 2.38 \text{ N} \end{aligned}$$

- B. EXPRESS THE RESULTS IN PART (A) IN FORMAL VECTOR NOTATION.

$$F_{N,1} = 2.38 \hat{j} \text{ N}$$

$$F_{N,2} = F_{N,2} \sin \theta \hat{i} + F_{N,2} \cos \theta \hat{j} \text{ N}$$

$$F_{N,2} = 1.88 \sin 35^\circ \hat{i} + 1.88 \cos 35^\circ \hat{j} \text{ N}$$

$$F_{N,2} = 1.08 \hat{i} + 1.54 \hat{j} \text{ N}$$