

B. C

准帶項目請打「V」	
V	簡單型計算機

本試題共 2 頁，4 大題

1. Short Answer:

- (a) (5%) What is the constraint on the application of instantaneous center of zero velocity?
 - (b) (15%) In a planar motion, given M_p the moment about a point p , $\bar{\alpha}$ the angular acceleration, and I_p the moment of inertia, what are the three conditions that the formula $M_p = I_p \bar{\alpha}$ is applicable?
 - (c) (5%) In the two-body problem, the angular momentum of a satellite is conserved. What is the implication of this result?
2. (25%) Prove by means of kinetics that if the block is released from rest at point B of a smooth path of arbitrary shape, as shown in Fig. 1, the speed it attains when it reaches point A is equal to the speed it attains when it falls freely through a distance h ; i.e., $v = \sqrt{2gh}$.
(If this problem is proved by means of energy, only 5 points are given.)

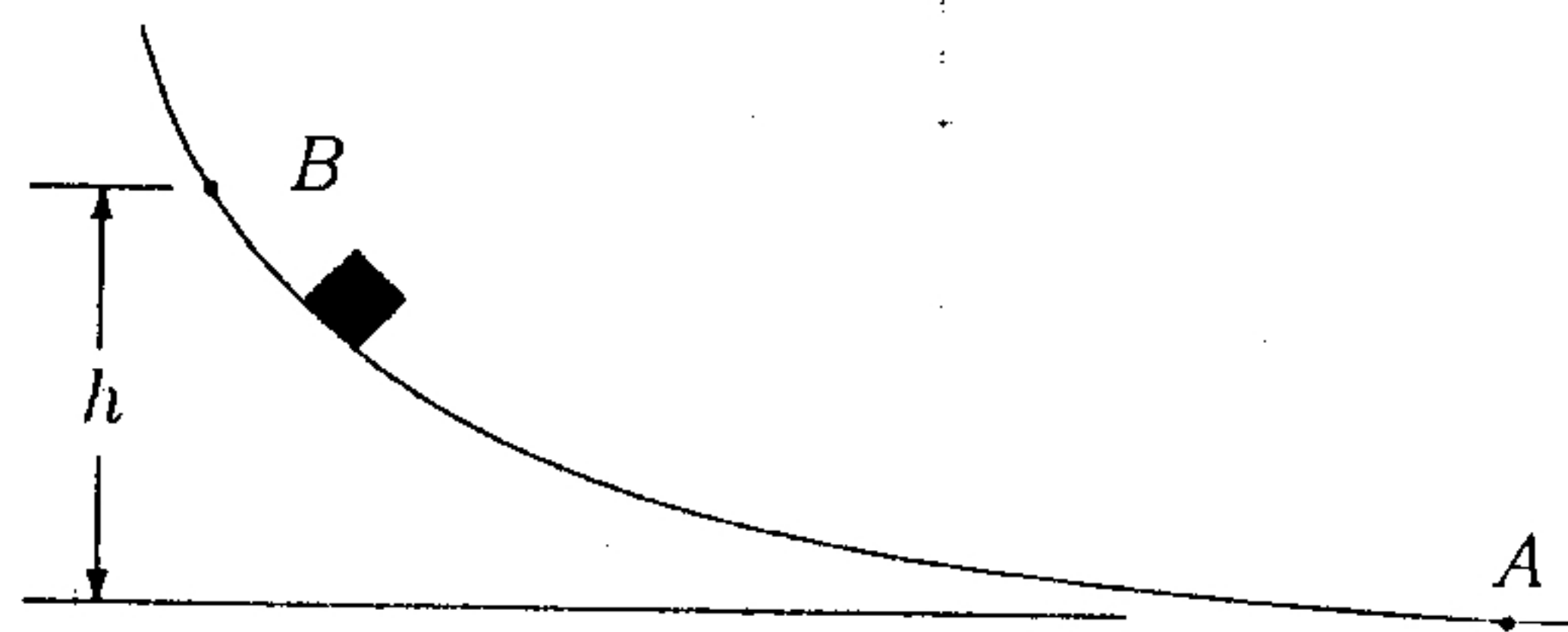


Figure 1: Figure for Prob. 2

3. (25%) As shown in Fig. 2, the bar remains in contact with the floor and with point A . If point B moves to the right with a constant velocity v_B , determine the angular velocity and angular acceleration of the bar as a function of x .

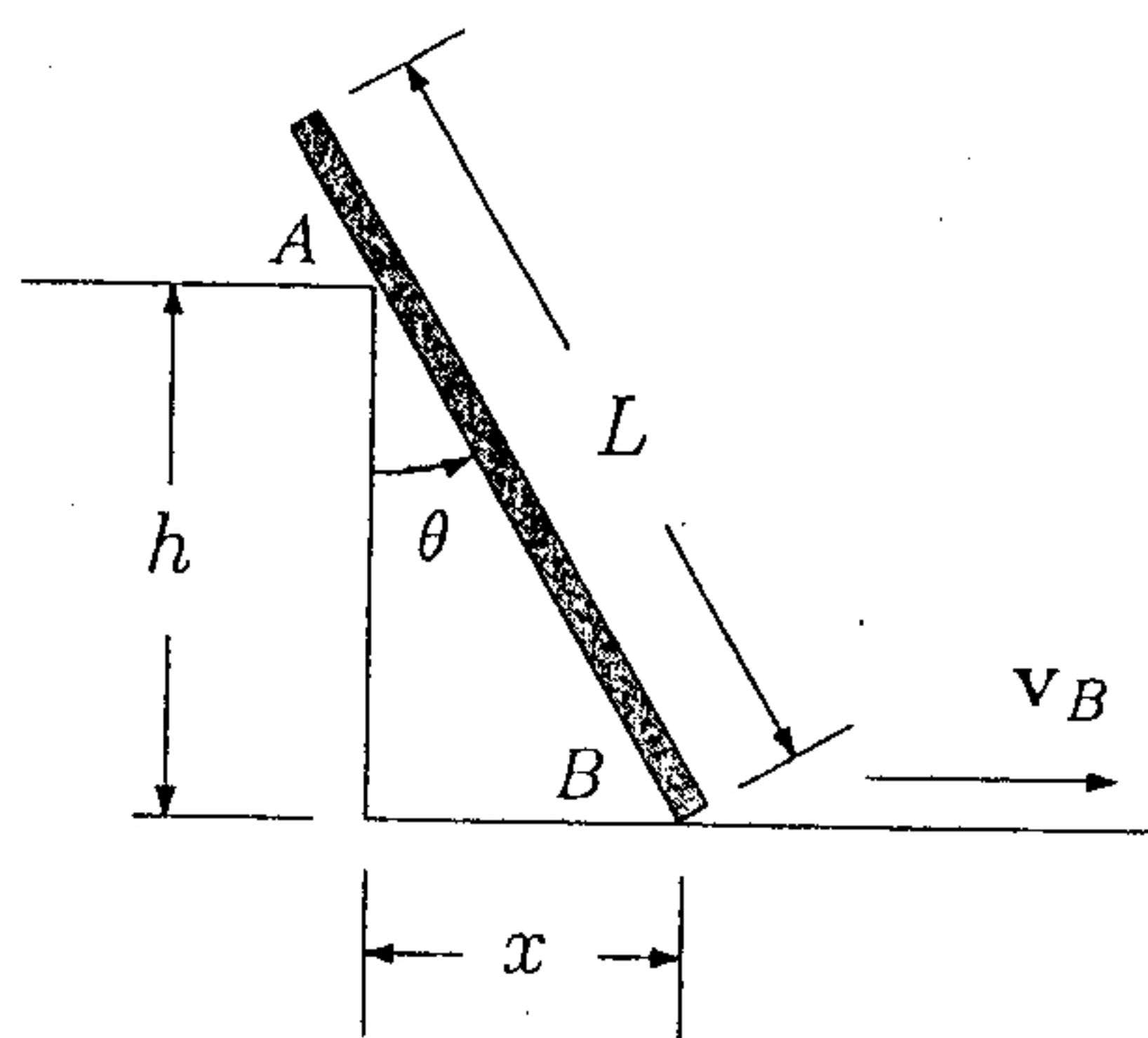


Figure 2: Figure for Prob. 3

82-2

系別：航空太空工程學系

科目：動力學

准帶項目請打「V」

簡單型計算機

本試題共 2 頁，4 大題

4. (25%) As shown in Fig. 3, the cone rolls without slipping such that at the instant shown $\omega_z = 4 \text{ rad/s}$ and $\dot{\omega}_z = 3 \text{ rad/s}^2$. Determine the velocity and acceleration of point A at this instant.

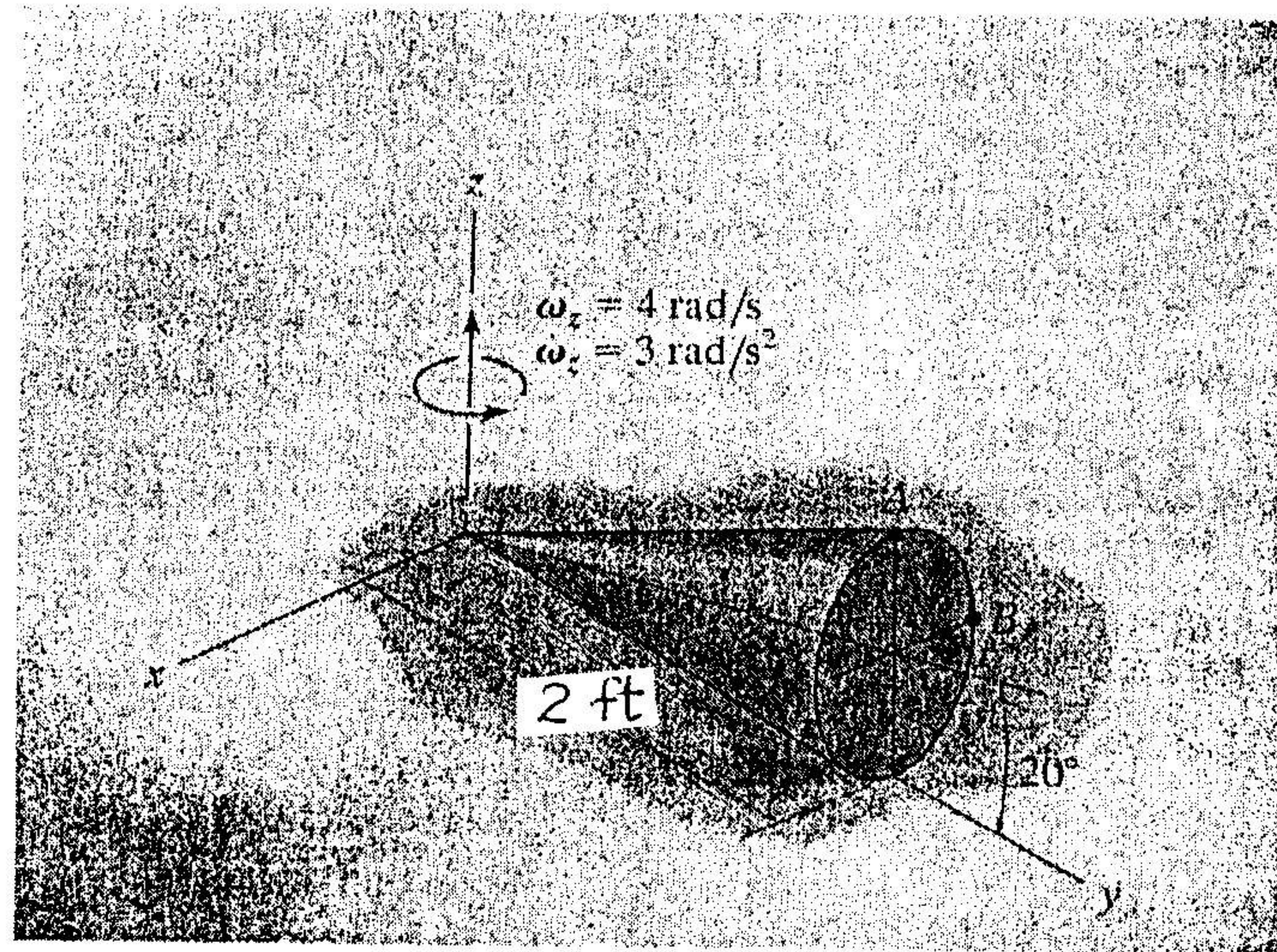


Figure 3: Figure for Prob. 4