Tutorial Set 8
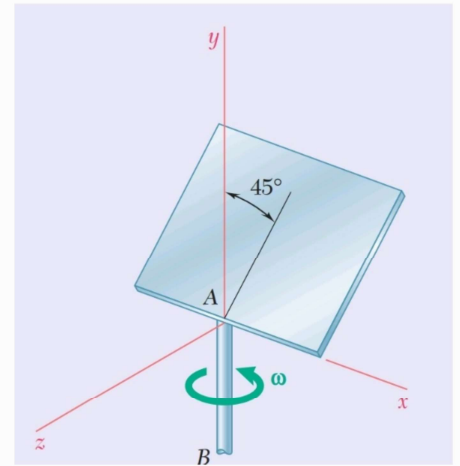
(Part A)

1> Determine the kinetic energy of the thin, homogeneous square plate of mass 'm' and side 'a' welded to a vertical shaft AB with which it forms a 45° angle.

2> The 5-kg rod BC is attached by pins to two uniform disks as shown. The mass of the 150 mm radius disk is 6 kg and that of the 75 mm radius is 1.5 kg. Knowing that the system is released from rest in the position shown, determine the velocity of the rod after disk A has rotated through 90°. Assume that disks roll without slip
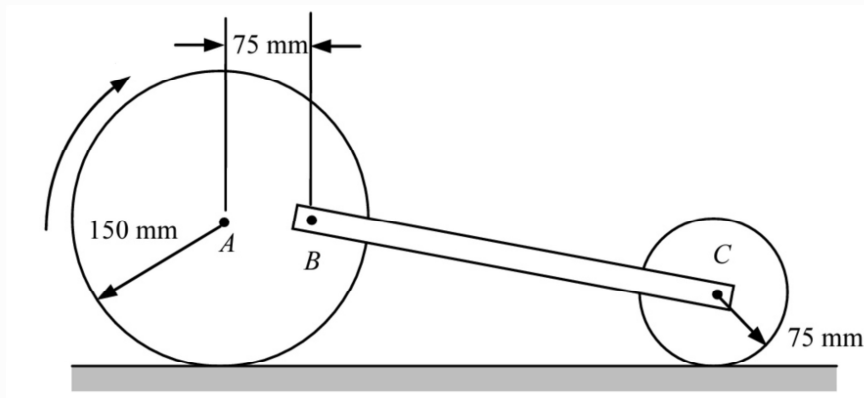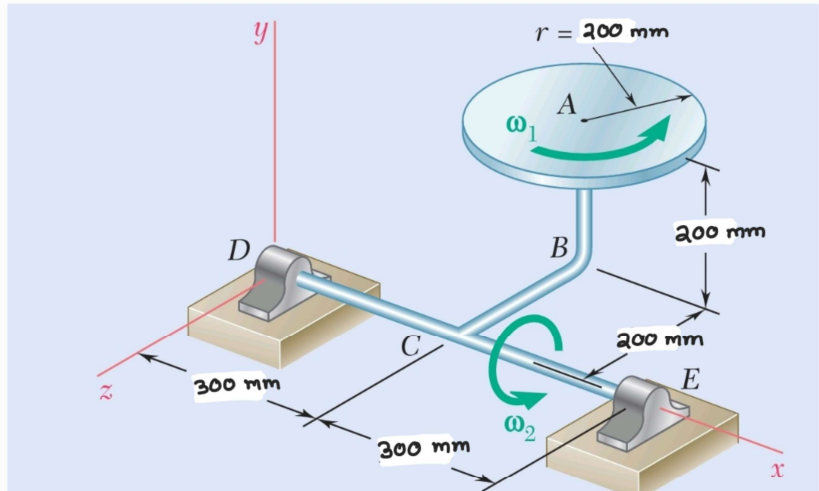
Part B

1) Determine kinetic energy of the disk

Mass $=$ 3.92 kg

$\omega_1 = 16$ rad/s

$\omega_2 = 8$ rad/s

Ans: $T = 21.32$ Nm

2) The 4-kg rod AB is attached to a collar of negligible mass at A and to a flywheel at B. The flywheel has a mass of 16 kg and a radius of gyration of 180 mm. Knowing that in the position shown the angular velocity of the flywheel is 60 rpm clockwise, determine the angular velocity of the flywheel when point B is directly below C.

Ans: $\omega = 84.7$ rad/s