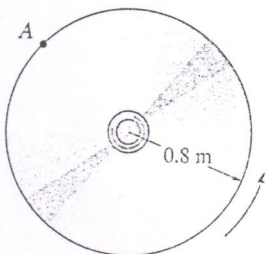


1- A wheel has an initial clockwise angular velocity of 10 rad/s and a constant angular acceleration of 3 rad/s². Determine the number of revolutions it must undergo to acquire a clockwise angular velocity of 15 rad/s. What time is required?

2- A flywheel has its angular speed increased uniformly from 15 rad/s to 60 rad/s in 80 s. If the diameter of the wheel is 0.6 m, determine the magnitudes of the normal and tangential components of acceleration of a point on the rim of the wheel when $t = 80$ s, and the total distance the point travels during the time period.

3- If the angular velocity of the disk is increased uniformly from 3 rev/min when $t = 0$ to 10 rev/min when $t = 4$ s, determine the magnitudes of the velocity and acceleration of point A on the disk when $t = 4$ s.

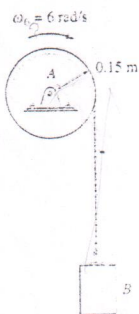


prob. 3

4- The tub of a washing machine is rotating at 50 rad/s when the power is turned off. If it takes 15 s for the tub to come to rest, determine (a) its constant angular deceleration, and (b) the total number of revolutions it makes.

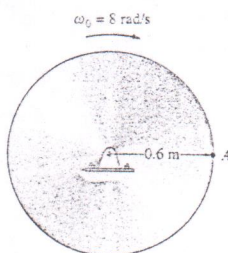
5- The angular position of a disk is defined by $\theta = (t + 4t^2)$ rad, where t is in minutes. Determine the number of revolutions, the angular velocity, and angular acceleration of the disk in 50 seconds.

6- If disk A has an initial angular velocity of $\omega_0 = 6$ rad/s and a constant angular acceleration $\alpha_A = 3$ rad/s², determine the magnitudes of the velocity and acceleration of block B when $t = 2$ s.



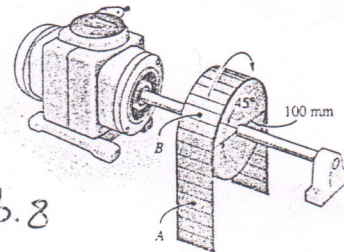
prob. 6

7- The disk is originally rotating at $\omega_0 = 8$ rad/s. If it is subjected to a constant angular acceleration $\alpha_c = 6$ rad/s², determine the magnitudes of the velocity and the n and t components of acceleration of point A at the instant $t = 3$ s.



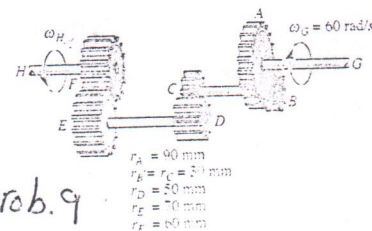
prob. 7

8- If the angular velocity of the drum is increased uniformly from 6 rad/s when $t = 0$ to 12 rad/s when $t = 5$ s, determine the magnitudes of the velocity and acceleration of points A and B on the belt when $t = 1$ s. At this instant the points are located as shown.



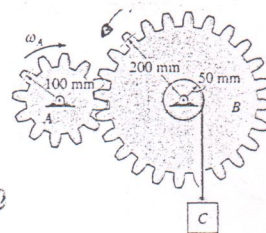
prob. 8

9- The operation of "reverse" for a three-speed automotive transmission is illustrated schematically in the figure. If the crank shaft G is turning with an angular speed of 60 rad/s, determine the angular speed of the drive shaft H. Each of the gears rotates about a fixed axis. Note that gears A and B, C and D, E and F are in mesh. The radii of each of these gears are reported in the figure.



prob. 9

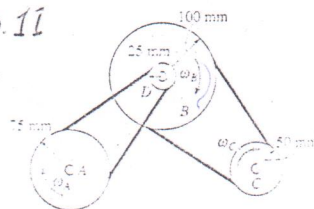
10- If the hoisting gear A has an initial angular velocity $\omega_A = 8$ rad/s and an angular deceleration $\alpha_A = -1.5$ rad/s², determine the velocity and acceleration of block C in 2 s.



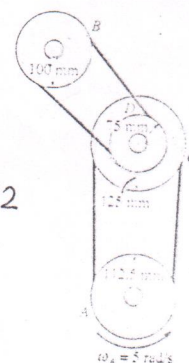
prob. 10

11- The power of a bus engine is transmitted using the belt-and-pulley arrangement shown. If the engine turns pulley A at $\omega_A = 60$ rad/s, determine the angular velocities of the generator pulley B and the air-conditioning pulley C. The hub at D is rigidly connected to B and turns with it.

prob. 11



12- A mill in a textile plant uses the belt-and-pulley arrangement shown to transmit power. When $t = 0$ an electric motor is turning pulley A with an angular velocity of $\omega_A = 5$ rad/s. If this pulley is subjected to a constant angular acceleration 2 rad/s², determine the angular velocity of pulley B after B turns 6 revolutions. The hub at D is rigidly connected to pulley C and turns with it.



prob. 12