PHY1235: Physics for Engineers

Instruction

The objective of this problem set is to get a good grasp of the kinematics of rotational motion.

Issued: 04/05/2020 --- **Due:**

Helpful readings for this homework: Lecture #1; Chapter 9, section 9.1-9.2 of University Physics

Problem Set #1: Kinematics of Rotational Motion

Problem 1:

The spin-drier of a washing machine revolving at 900 rpm slows down uniformly to 300 rpm while making 50 revolutions. Find (a) the angular acceleration and (b) the time required to turn through these 50 revolutions.

Problem 2:

A wheel of 40-cm radius rotates on a stationary axle. It is uniformly speeded up from rest to a speed of 900 rpm in a time of 20 s. Find (a) the constant angular acceleration of the wheel and (b) the tangential acceleration of a point on its rim.

Problem 3:

A car has wheels of radius 30 cm. It starts from rest and accelerates uniformly to a speed of 15 m/s in a time of 8.0 s. Find the (a) angular acceleration of its wheels and (b) the number of rotations one wheel makes in this time.

Expected Answers

Problem 1:

a) -4.0π rad/s^2

b) 5.0 s

Problem 2:

a) 4.7 rad/s^2

b) 1.9 m/s^2

Problem 3:

a) 6.2 rad/s^2

b) 32 rev