- 1. A ventilation fan has blades 0.25 m long rotating at 20 rpm. What is the tangential velocity of each blade tip?
 - a. 0.02 m/s b. 0.52 m/s c. 5.0 m/s d. 20 m/s
- 2. A point on the rim of a 0.25 m radius rotating wheel has a centripetal acceleration of 4.0 m/s,. What is the angular velocity of the wheel ?
 - a. 1.0 rad/s b. 2.0 rad/s c. 3.2 rad/s d. 4.0 rad/s
- 3. A 0.12 m radius grinding wheel takes 5.5 s to speed up from 2.0 rad/s to 11.0 rad/s. What is the wheel's average angular acceleration?
 - a. 9.6 rad/s² b. 4.8 rad/s² c. 1.6 rad/s² d. 0.33 rad/s²
- 4. A 0.30 kg rock is swung in a circular path and in a vertical plane on a 0.25 m length string. At the top of the path, the angular velocity is 12.0 rad/s. What is the tension in the string at that point?
 - a. 7.8 N b. 15.4 N c. 18 N d. 83 N
- 5. A bowling ball has a mass of 7.0 kg, a moment of inertia of 0.028 kg-m² and a radius of 0.10 m. If it rolls down the lane without slipping at a linear speed of 4.0 m/s, what is its total kinetic energy?
 - a. 44.8 J b. 32.0 J c. 11.2 J d. 78.4 J

6. A uniform, horizontal beam of length 6 m and weight 120 N is attached at one end to a wall by a pin connection (so that it may rotate). The opposite end is supported by a cable attached to the wall above the pin. The cable makes an angle of 60 degree with the horizontal. What is the tension in the cable needed to maintain the beam in equilibrium?

a. 35 N b. 69 N c. 60 N d. 120 N

7. A ventilation fan with a moment of inertia of 0.034 kgm² has a new torque of 0.11 Nm applied to it. If it starts from rest, what angular momentum will it have 8 s later ?

0.88 kg m²/s 0.97 kg m²/s 2.0 kg m²/s 3.25 kg m²/s

- 8. A 80 kg man is one fourth of the way up a 10 m ladder that is resting against a smooth frictionless wall. If the ladder is 20 kg and it makes an angle of 60 degrees with the ground, find the force of friction of the ground on the foot of the ladder
 - 170 N 196 N 50 N 138 N
- 9. An 800 N billboard worker stands on a 4 m scaffold weighing 500 N and supported by vertical ropes at each end. How far would the worker stand from one of the supporting ropes to produce a tension of 550 N in that rope?

a. 1.4 m b. 2.0 m c. 2.5 m d. 2.7 m