Question 1

It is desired that the outer edge of a grinding wheel 9.0 cm in radius move at a rate of 6.0 m/s. (a) Determine the angular speed of the wheel. (b) What length of thread could be wound on the rim of the wheel in 3.0 sec when it is turning at this rate?

- A) (a) 6.7 rad/s, (b) 2 m
- B) (a) 67 rad/s, (b) 18 m
- C) (a) 0.67 rad/s, (b) 113 m
- D) (a) 0.54 rad/s, (b) 0.5 m

### Question 2

A wheel 25.0 cm in radius turning at 120 rpm increases its frequency to 660 rpm in 9.00 s. Find (a) the constant angular acceleration in rad/s<sup>2</sup>, and (b) the tangential acceleration of a point on its rim.

- A) (a) 377 rad/s<sup>2</sup> (b) 0.25 cm/s<sup>2</sup>
- B) (a) 6.28 rad/s<sup>2</sup> (b) 157 cm/s<sup>2</sup>
- C) (a) 7.7 rad/s<sup>2</sup> (b) 4.0 cm/s<sup>2</sup>
- D) (a) 0.018 rad/s<sup>2</sup> (b) 990 cm/s<sup>2</sup>

# Question 3

A car rounds a curve at constant speed. Which of the following statements is correct?

- A) The velocity of the car is constant.
- B) The car has an acceleration directed outward from the center of the curve.
- C) The car has an acceleration directed inward toward the center of the curve.
- D) The car has zero acceleration.

# Question 4

A rock is swung on the end of a rope in a horizontal circle at constant speed. The rope breaks. Immediately after the rope breaks, the ball will

A) fall straight down to the ground.

- B) move inward toward the center of the circle.
- C) move outward normal to the circle from the point the rope broke.
- D) move outward tangent to the circle from the point the rope broke.

# Question 5

A spacecraft orbits an unknown planet at a distance of  $5.2 \times 107$  m from its center. The period of its orbit is 52 hours. What is the mass of the planet?

A) 2.4 x 1024kg B) 3.5 x 1022kg C) 9.2 x 1025kg D) 6.1 x 1026kg

### Question 6

Calculate the velocity of a satellite that is in a circular orbit with a radius of  $7.5 \times 107$  m measured from the center of the earth.

- A) 2940 m/s
- B) 2300 m/s

- C) 1680 m/s
- D) 7470 m/s

Question 7

A boy whirls a ball on a string 1.0 m long in a horizontal circle at 50 rpm. If the mass of the ball is 0.22 kg, what is the tension in the string?

- A) 13.2 N
- B) 8.7 N
- Ć) 6.0 N
- D) 550 N

Question 8

A jetliner traveling at 600 km/h is turning in a circle of radius 2.5 km. What is its centripetal acceleration?

- A) 144,000 m/s2
- B) 144 m/s2
- C) 11 m/s2
- D) 4.8 m/s2

Question 9

Kepler's Laws:

A) apply only to the motion of the earth

- B) can be used to predict eclipses
- C) are fundamental laws of nature
- D) can be deduced from Newton's laws of motion and gravity