

Textbook problems for Regular Physics - Unit 6 (Textbook problems Ch. 7-8)

Ch 7 p. 269 #'s 4, 13, 14, 16-19, 25, 28, 31, 33-36, and 48.

Ch. 8 p. 305 #'s 2, 3, 6, and 9

4. When a wheel rotates about a fixed axis, do all points on the wheel have the same angular speed?
13. When a wheel rotates about a fixed axis, do all the points on the wheel have the same tangential speed?
14. Correct the following statement: The racing car rounds the turn at a constant velocity of 145 km/h.
16. An object moves in a circular path with constant speed  $v$ .
- Is the object's velocity constant? Explain.
  - Is its acceleration constant? Explain.
17. Give an example of a situation in which an automobile driver can have a centripetal acceleration but no tangential acceleration.
18. Can a car move around a circular racetrack so that the car has a tangential acceleration but no centripetal acceleration?
19. The gas pedal and the brakes of a car accelerate and decelerate the car. Could a steering wheel perform either of these two actions? Explain.
25. A building superintendent twirls a set of keys in a circle at the end of a cord. If the keys have a centripetal acceleration of  $145 \text{ m/s}^2$  and the cord has a length of 0.34 m, what is the tangential speed of the keys?  
(See Sample Problem 7G.)
28. Why does the water remain in a pail that is whirled in a vertical path, as shown in **Figure 7-16**?

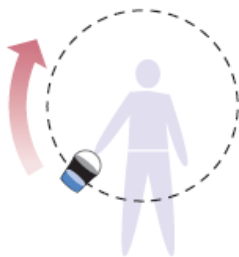
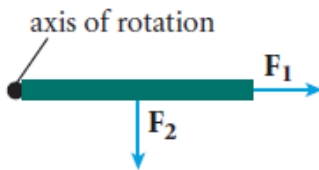


Figure 7-16

31. Comment on the statement, "There is no gravity in outer space."
33. Because of Earth's rotation, you would weigh slightly less at the equator than you would at the poles. Why?
34. Why does mud fly off a rapidly turning wheel?
35. Astronauts floating around inside the space shuttle are not actually in a zero-gravity environment. What is the real reason astronauts seem weightless?
36. A girl at a state fair swings a ball in a vertical circle at the end of a string. Is the force applied by the string greater than the weight of the ball at the bottom of the ball's path?
48. A  $2.00 \times 10^3$  kg car rounds a circular turn of radius 20.0 m. If the road is flat and the coefficient of static friction between the tires and the road is 0.70, how fast can the car go without skidding?

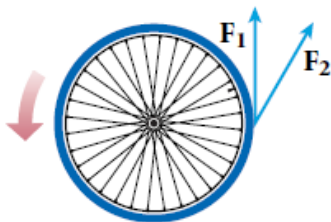
## Ch 8

2. Which of the forces acting on the rod in **Figure 8-19** will produce a torque about the axis at the left end of the rod?



**Figure 8-19**

6. Two forces of equal magnitude act on a wheel, as shown in **Figure 8-20**. Which force will produce the greater torque on the wheel?



**Figure 8-20**

3. Two children are rolling automobile tires down a hill. One child claims that the tire will roll faster if one of them curls up in the tire's center. The other child claims that will cause the tire to roll more slowly. Which child is correct?
9. A bucket filled with water has a mass of 54 kg and is hanging from a rope that is wound around a 0.050 m radius stationary cylinder. If the cylinder does not rotate and the bucket hangs straight down, what is the magnitude of the torque the bucket produces around the center of the cylinder? (See Sample Problem 8A.)