Example problems for chapter 8

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. If a net torque is applied to an object, that object will experience which of the following?
a. a constant angular speed
b. an angular acceleration
c. a constant moment of inertia
d. an increasing moment of inertia

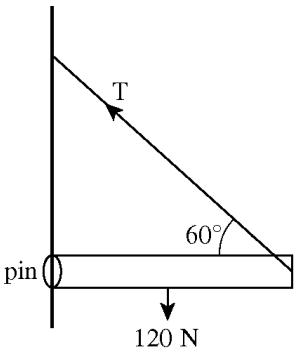
____ 2. Where should a force be applied on a lever arm to produce the most torque?
a. closest to the axis of rotation
b. farthest from the axis of rotation
c. in the middle of the lever arm
d. It doesn't matter where the force is applied.

____ 3. A bucket filled with water has a mass of 23 kg and is attached to a rope that is wound around a cylinder with a radius of 0.050 m at the top of a well. What torque does the weight of the water and bucket produce on the cylinder? (g = 9.81 m/s^2.)
a. 34 N•m
b. 17 N•m
c. 11 N•m
d. 23 N•m

____ 4. A force of 4.0 N is applied to a door at an angle of 60.0° and a distance of 0.30 m from the hinge. What is the torque produced?
a. 1.0 N•m
b. 0.75 N•m
c. 0.87 N•m
d. 0.22 N•m

____ 5. Which of the following statements is correct?
a. The farther the center of mass of an object is from the axis of rotation, the less difficult it is to rotate the object.
b. The farther the center of mass of an object is from the axis of rotation, the smaller the object's moment of inertia is.
c. The farther the center of mass of an object is from the axis of rotation, the greater the object's moment of inertia is.
d. The farther the center of mass of an object is from the axis of rotation, the greater the object's moment of inertia is, but the less difficult it is to rotate the object.

____ 6. A meterstick supported by a knife edge at the 50 cm mark has masses of 0.40 kg and 0.60 kg hanging from the 20 cm and 80 cm marks, respectively. At what mark should a third mass of 0.30 kg be hung to keep the stick balanced?
a. 20 cm
b. 70 cm
c. 30 cm
d. 25 cm



____ 7. A uniform horizontal beam with a length of 6.0 m and a weight of 120 N is attached at one end to a wall by a pin connection so that the beam can rotate. The opposite end of the beam is supported by a cable attached to the wall above the pin. The cable makes an angle of 60.0° with the beam. What is the tension in the cable needed to maintain the beam in equilibrium?

a. 35 N
b. 69 N
c. 6.0×10^1 N
d. 120 N

____ 8. Torque is defined as _____.

a. mass times velocity
b. force times lever arm
c. momentum times radius
d. force times time
e. mass times acceleration

____ 9. The resistance an object has to changes in its rotational state of motion is called rotational _____.

a. inertia
b. momentum
c. torque
d. acceleration
e. velocity

____ 10. A meter stick is balanced at the 50.0-cm mark. You tie a 10.0-N weight at the 15.0-cm mark. Where should a 30.0-N weight be placed so the meter stick will again be balanced?

a. 10.0-cm mark
b. 15.0-cm mark
c. 61.7-cm mark
d. 25.0-cm mark
e. 30.0-cm mark

____ 11. A 3-kg ball is whirled on the end of a string that is 2 m long. The ball's linear speed is 4 m/s. What is its angular momentum?

a. 2 kg·m·m/s
b. 6 kg·m·m/s
c. 8 kg·m·m/s
d. 24 kg·m·m/s
e. 48 kg·m·m/s

Problem

12. Suppose the torque produced by a wrench on a stubborn nut is 30 N·m. If the lever arm is doubled with no change in force, what is the resulting torque?

13. A 40-kg boy sits on a seesaw 2.0 m from the fulcrum. What distance from the fulcrum should a 30-kg girl sit in order to balance the seesaw?

14. A ball at the end of a long rope is swung in a horizontal circular path. The rope is then pulled in so that the radius of the path is $\frac{1}{2}$ as big. How does the tangential speed of the ball change?

Example problems for chapter 8
Answer Section

MULTIPLE CHOICE

1.	ANS: B	PTS: 1	DIF: I	OBJ: 8-1.2			
2.	ANS: B	PTS: 1	DIF: I	OBJ: 8-1.2			
3.	ANS: C	PTS: 1	DIF: IIIB	OBJ: 8-1.3			
4.	ANS: A	PTS: 1	DIF: IIIB	OBJ: 8-1.3			
5.	ANS: C	PTS: 1	DIF: I	OBJ: 8-2.2			
6.	ANS: C	PTS: 1	DIF: IIIB	OBJ: 8-2.4			
7.	ANS: B	PTS: 1	DIF: IIIB	OBJ: 8-2.4			
8.	ANS: B	PTS: 1	DIF: 1	REF: p. 151			
	OBJ: 11.1	STA: SC.C.2.4					
9.	ANS: A	PTS: 1	DIF: 1	REF: p. 154			
	OBJ: 11.4	STA: SC.C.1.4					
10.	ANS: C	PTS: 1	DIF: 3	REF: p. 153			
	OBJ: 11.2	STA: SC.C.2.4.6					
11.	ANS: D	PTS: 1	DIF: 2	REF: p. 162			
	OBJ: 11.6	STA: SC.C.1.4					

PROBLEM

12. ANS:
60 N·m

PTS: 1 DIF: 3 REF: p. 151 OBJ: 11.1
STA: SC.C.2.4

13. ANS:
2.7 m

PTS: 1 DIF: 3 REF: p. 153 OBJ: 11.2
STA: SC.C.2.4.6

14. ANS:
increases by a factor of 2

PTS: 1 DIF: 3 REF: p. 155 OBJ: 11.4
STA: SC.C.1.4