Physics 1A– 8 AM class
Quiz # 4 Nov. 30, 2007
Prof. Jose Onuchic

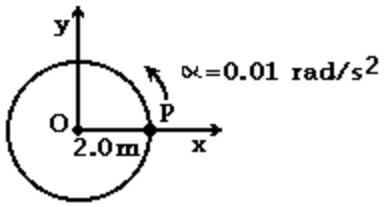
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Two billiard balls have velocities of 2.0 m/s and –1.0 m/s when they meet in an elastic head on collision. What is the final velocity of the first ball after collision?
A) –1.0 m/s B) –0.5 m/s C) –2.0 m/s D) +2.0 m/s E) +1.0 m/s

2) A 7.0kg bowling ball strikes a 2.0kg pin. The pin flies forward with a velocity of 6.0 m/s; the ball continues forward at 4.0 m/s. What was the original velocity of the ball?
A) 5.7 m/s B) 7.2 m/s C) 6.6 m/s D) 4.0 m/s E) 3.3 m/s

3) A 0.12–kg ball is moving at 6 m/s when it is hit by a bat, causing it to reverse direction and have a speed of 14 m/s. What is the change of momentum of the ball?
A) 0.39 kg.m/s B) 0.42 kg.m/s C) 2.4 kg.m/s D) 1.42 kg.m/s E) 1.3 kg.m/s

Figure 1



Point P is on the rim of a wheel of radius 2.0 m. At time t = 0, the wheel is at rest, and P is on the x–axis. The wheel undergoes a uniform angular acceleration of 0.01 rad/s^2 about the center O.

4) In Figure 1, the linear speed of P, when it reaches the y–axis, is closest to:
A) 0.35 m/s B) 0.18 m/s C) 0.24 m/s D) 0.71 m/s E) 0.49 m/s

5) Popeye, of mass 70 kg, has just downed a can of spinach. He accelerates quickly and stops Bluto, of mass 700 kg (Bluto is very dense), who is charging in at 10 m/s. What was Popeye's velocity?
A) 10 m/s B) 31 m/s C) 50 m/s D) 100 m/s E) 150 m/s

6) 5. A 0.15–m–radius grinding wheel starts at rest and develops an angular velocity of 12.0 rad/s in 4.0 s. What is the average tangential acceleration of a point on the wheel's edge?
A) 28 m/s^2 B) 0.45 m/s^2 C) 1.85 m/s^2 D) 6.8 m/s^2 E) 14 m/s^2

7) A satellite is in a circular orbit about the Earth at a distance of one Earth radius above the surface. What is the velocity of the satellite? (The radius of the Earth is 6.4 x 10^6 m, the mass of the Earth is 5.98 x 10^{24} kg, and G= 6.67 x 10^{-11} N .m^2/kg^2.)
A) 5,600 m/s B) 7,900 m/s C) 4,200 m/s D) 2,800 m/s E) 16,800 m/s

8) A railroad freight car, mass 15 000 kg, is allowed to coast along a level track at a speed of 2.0 m/s. It collides and couples with a 50 000–kg loaded second car, initially at rest and with brakes released. What percentage of the initial kinetic energy of the 15 000–kg car is preserved in the two–coupled cars after collision?

A) 14% B) 23% C) 50% D) 86% E) 100%

Answer Key
Testname: QUIZ4AA.TST

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) A
2) A
3) C
4) A
5) D
6) B
7) A
8) B