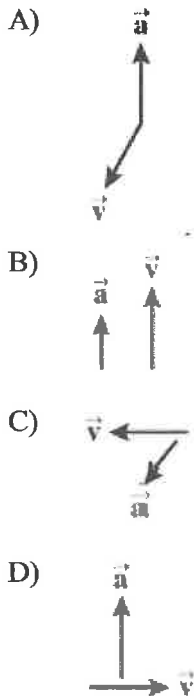


Ch 9 Gravity and Fcp

9.1 Conceptual Questions

_____ 1) Shown below are the velocity and acceleration vectors for an object in several different types of motion. In which case is the object's velocity changing while its speed is not changing?



_____ 2) If a satellite moves with constant speed in a perfectly circular orbit around the earth, what is the direction of the acceleration of the satellite?

- A) in the forward direction
- B) in the backward direction
- C) outward away from the earth
- D) inward toward the earth
- E) The acceleration is zero because the speed is constant.

_____ 3) An object moves in a circular path at a constant speed. Compare the direction of the object's velocity and acceleration vectors.

- A) Both vectors point in the same direction.
- B) The vectors point in opposite directions.
- C) The vectors are perpendicular to each other.
- D) The acceleration is zero but the velocity is constant.

_____ 4) The Moon is accelerated toward the earth, so it is gradually getting closer to the earth.

- A) True
- B) False
- C) The moon is not accelerated toward the earth.

- _____ 5) When a car goes around a circular curve on a horizontal road at constant speed, what force causes it to follow the circular path?
- A) the normal force from the road
 - B) the friction force from the road
 - C) gravity
 - D) No force causes the car to do this because the car is traveling at constant speed and therefore has no acceleration.
- _____ 6) A car goes around a circular curve on a horizontal road at constant speed. What is the direction of the friction force on the car due to the road?
- A) tangent to the curve in the forward direction
 - B) tangent to the curve opposite to the direction of the car's motion
 - C) perpendicular to the curve outward
 - D) perpendicular to the curve inward
 - E) There is no friction on the car because its speed is constant.
- _____ 7) When an object moves in uniform circular motion, the direction of its acceleration is
- A) in the same direction as its velocity vector.
 - B) in the opposite direction of its velocity vector.
 - C) is directed toward the center of its circular path.
 - D) is directed away from the center of its circular path.
 - E) depends on the speed of the object.
- _____ 8) If you swing a bucket of water fast enough in a vertical circle, at the highest point the water does not spill out. This happens because an outward force balances the pull of gravity on the water.
- _____ 9) Two small balls, A and B, attract each other gravitationally with a force of magnitude F . If we now double both masses and the separation of the balls, what will now be the magnitude of the attractive force on each one?
- A) $16F$
 - B) $8F$
 - C) $4F$
 - D) F
 - E) $F/4$
- _____ 10) Two small objects, with masses m and M , are originally a distance r apart, and the magnitude of the gravitational force on each one is F . The masses are changed to $2m$ and $2M$, and the distance is changed to $4r$. What is the magnitude of the new gravitational force?
- A) $F/16$
 - B) $F/4$
 - C) $16F$
 - D) $4F$
 - E) $F/2$

- _____ 11) Two small objects, with masses m and M , are originally a distance r apart, and the gravitational force on each one has magnitude F . The second object has its mass changed to $2M$, and the distance is changed to $r/4$. What is the magnitude of the new gravitational force?
- A) $F/32$
 - B) $F/16$
 - C) $16F$
 - D) $32F$
 - E) $2F$
- _____ 12) A spaceship is traveling to the Moon. At what point is it beyond the pull of Earth's gravity?
- A) when it gets above the atmosphere
 - B) when it is half-way there
 - C) when it is closer to the Moon than it is to Earth
 - D) It is never beyond the pull of Earth's gravity.
- _____ 13) If you stood on a planet having a mass four times that of Earth's mass, and a radius two times that of Earth's radius, you would weigh
- A) the same as you do on Earth.
 - B) two times more than you do on Earth.
 - C) two times less than you do on Earth.
 - D) four times more than you do on Earth.
- _____ 14) An piece of space debris is released from rest at an altitude that is two earth radii from the center of the earth. Compared to its weight on Earth, the weight of this debris is
- A) zero.
 - B) the same as on the surface of the earth.
 - C) one-half of its weight on the surface of the earth.
 - D) one-third of its weight on the surface of the earth.
 - E) one-quarter of its weight on the surface of the earth.
- _____ 15) Halley's Comet is in a highly elliptical orbit around the sun. Therefore the orbital speed of Halley's Comet, while traveling around the sun,
- A) is constant.
 - B) increases as it nears the Sun.
 - C) decreases as it nears the Sun.
 - D) is zero at two points in the orbit.

9.2 Problems

- _____ 16) You are driving at 30.0 m/s on a freeway curve of radius 25.0 m . What is the magnitude of your acceleration?
- A) 36.0 m/s^2
 - B) 1.20 m/s^2
 - C) 20.8 m/s^2
 - D) 0.833 m/s^2

Name: _____

ID: A

- ____ 17) A 0.50-kg toy is attached to the end of a 1.0-m very light string. The toy is whirled in a horizontal circular path on a frictionless tabletop. If the maximum tension that the string can withstand without breaking is 350 N. What is the maximum speed the mass can have without breaking the string?
- A) 700 m/s
 - B) 26 m/s
 - C) 19 m/s
 - D) 13 m/s

**Ch 9 Gravity and Fcp
Answer Section**

1) ANS: D	PTS: 1	REF: Var: 1
2) ANS: D	PTS: 1	REF: Var: 1
3) ANS: C	PTS: 1	REF: Var: 1
4) ANS: B	PTS: 1	REF: Var: 1
5) ANS: B	PTS: 1	REF: Var: 1
6) ANS: D	PTS: 1	REF: Var: 1
7) ANS: C	PTS: 1	REF: Var: 1
8) ANS: F	PTS: 1	REF: Var: 1
9) ANS: D	PTS: 1	REF: Var: 1
10) ANS: B	PTS: 1	REF: Var: 1
11) ANS: D	PTS: 1	REF: Var: 1
12) ANS: D	PTS: 1	REF: Var: 1
13) ANS: A	PTS: 1	REF: Var: 1
14) ANS: E	PTS: 1	REF: Var: 1
15) ANS: B	PTS: 1	REF: Var: 1
16) ANS: A	PTS: 1	REF: Var: 50+
17) ANS: B	PTS: 1	REF: Var: 1