# CH 7 & 8: CIRCULAR MOTION & GRAVITY REVIEW

1.  When you roll a tapered cup across a table, the path of the cup curves because the wider end rolls
    a.  slower.
    b.  at the same speed as the narrow part.
    c.  faster.
    d.  in an unexplained way.

2.  When you whirl a tin can in a horizontal circle overhead, the force that holds the can in the path acts
    a.  in an inward direction.
    b.  in an outward direction.
    c.  in either an inward or outward direction.
    d.  parallel to the force of gravity.

3.  A bug inside a can whirled in a circle feels a force of the can on its feet. This force acts
    a.  in an inward direction.
    b.  in an outward direction.
    c.  in either an inward or outward direction.
    d.  parallel to the force of gravity.

4.  Newton determined that the pull of Earth's gravity caused both apples and
    a.  the moon to fall toward Earth.
    b.  the moon to move away from Earth.
    c.  the sun to move away from Earth.
    d.  stars to fall toward Earth.

5.  The moon falls toward Earth in the sense that it falls
    a.  with an acceleration of 10 m/s$^2$, as apples fall on Earth.
    b.  with an acceleration greater than 10 m/s$^2$.
    c.  beneath the straight-line path it would take without gravity.
    d.  above the straight-line path it would take without gravity.

6.  Planets remain in orbit while falling around the sun due to their
    a.  tangential velocities.
    b.  zero tangential velocities.
    c.  accelerations of about 10 m/s$^2$.
    d.  centrifugal forces that keep them up.

7.  Newton did not discover gravity, for early humans discovered it whenever they fell. What Newton did discover is that gravity
    a.  tells us about why the universe expands.
    b.  tells us how to discover new planets.
    c.  accounts for the existence of black holes.
    d.  extends throughout the universe.

8.  Consider a space probe three times as far from Earth's center. Compared at Earth's surface, its gravitational attraction to Earth at this distance is about
    a.  one third as much.
    b.  one half as much.
    c.  one ninth as much.
    d.  zero.

9.  Compared to the gravitational field of Earth at its surface, Earth's gravitational field at Earth's center is
    a.  zero.
    b.  half as much.
    c.  twice as much.
    d.  three times as much.

10. When an astronaut in orbit is weightless, he or she is
    a. beyond the pull of Earth's gravity.
    **b.** still in the pull of Earth's gravity.
    c. in the pull of interstellar gravity.
    d. beyond the pull of the sun's gravity.

11. If the mass of Earth increased, with no change in radius, your weight would _____.
    a. stay the same
    b. decrease
    **c.** increase also

12. The gravitational force between two massive spheres _____. (circle all that apply)
    **a.** is always an attraction.
    **b.** depends on how massive they are.
    **c.** depends inversely on the square of the distances between them.

13. A very massive object A and a less massive object B move toward each other under the influence of mutual gravitation. Which force, if either, is greater?
    a. The force on B
    b. The force on A
    **c.** Both forces are the same.

14. A satellite in elliptical orbit about Earth travels
    **a.** fastest when it moves closer to Earth.
    b. fastest when it moves farther from Earth.
    c. slowest when it moves closer to Earth.
    d. at the same rate for the entire orbit.

15. Kepler is credited as being the first to discover that the paths of planets around the sun are
    a. circles.
    **b.** ellipses.
    c. straight lines most of the time.
    d. spirals.

**Problems**

16. At an amusement park, you and a friend sit on a large rotating disk. You sit at the edge and have a rotational speed of 4 RPM and a linear speed of 6 m/s. Your friend sits halfway to the center. What is her rotational speed? What is her linear speed?
    Same rotational speed but her linear speed is ½ as much.

17. Suppose that an apple at the top of a tree is pulled by Earth's gravity with a force of 1 N. If the tree were twice as tall, would the force of gravity on the apple be only 1/4 as strong? Explain your answer.
    No, the tree is not twice as far to the center of Earth, the force would be about the same.

18. Your weight depends on what factors? Mass, gravity, distance to the center of Earth.

19. The attractive force that exists between all objects is known as what Force of gravity.

20. By what factor would your weight be multiplied if Earth's diameter were 2 times as big and Earth's mass remained unchanged? ¼ as much

21. Calculate the force of gravity between Earth (mass = $6.0 \times 10^{24}$ kg) and the moon (mass = $7.4 \times 10^{22}$ kg). The average distance between the earth and the moon is $3.8 \times 10^8$ m. $2 \times 10^{20}$ N