Physics 109 Quiz 2 - Answers February 14, 2014

1. A spinning Frisbee is thrown between two persons in a park. The motion of the Frisbee is
   (A) purely translational.
   (B) neither rotational nor translational.
   (C) rotational and translational.
   (D) purely rotational.

2. An object that has kinetic energy must be
   (A) moving
   (B) at an elevated position
   (C) at rest
   (D) none of the above

3. You push on a box with a force of 20 N and the box moves a distance of 8 m. The amount of work you have done on the box is
   (A) 20 J
   (B) 160 J
   (C) 320 J
   (D) 0 J

4. Consider a rotating ball. If the angular speed (ω) of the ball is doubled, by how much does the rotational kinetic energy change?
   (A) the rotational kinetic energy stays the same.
   (B) the rotational kinetic energy doubles.
   (C) the rotational kinetic energy increases by a factor of four.
   (D) the ball does not have rotational kinetic energy

5. It is possible for two objects of equal mass to have different rotational masses because
   (A) The objects may be made out of different materials.
   (B) Rotational mass depends on total mass and mass distribution.
   (C) Rotational mass is always half the total mass.
   (D) An object not rotating has no rotational mass.

6. When your car slides on an icy road, it is very hard to control because
   (A) The bumps in the road are magnified due to sliding.
   (B) Sliding (kinetic) friction is weaker than static friction.
   (C) Static friction is weaker than sliding (kinetic) friction.
   (D) Air resistance is the only force acting on the car.

7. Power is
   (A) The amount of heat generated when a job is done.
   (B) The rate at which energy or work is used, stored, dissipated, etc.
   (C) The amount of energy used multiplied by time.
   (D) The amount of energy used to do a particular job.

8. Rotational symmetry is the underlying reason for
   (A) momentum conservation
   (B) Newton's $2nd$ law
   (C) energy conservation
   (D) angular momentum conservation

9. Torque can best be described as
   (A) rotation in radians
   (B) angular momentum
   (C) angular force
   (D) a push or a pull

10. Consider a 100 kg father and his 20 kg girl. They decide to enjoy balancing on a seesaw, which is a uniform board 4 m long and pivoted exactly at its center. If girl sits at the seesaw's end (2m from the center), how far from the center on the other side should the father sit?
    (A) 1.5 m
    (B) Farther out than the board will allow.
    (C) 0.5 m
    (D) 0.4 m

11. For momentum to be conserved in a system it must
    (A) experience a dissipative forces like drag.
    (B) not be connected to a motor.
    (C) experience no net external force.
    (D) be weightless

12. Suppose you are standing on a bathroom scale when you are flying in a jet airplane. For a moment the scale reads less than your actual weight. During that moment, it's exerting an upward force on you that is
    (A) equal to your weight.
    (B) less than your weight.
    (C) greater than your weight
    (D) equal to zero

13. A popular playground toy is a flexible seat that has automobile springs attached to it for a little bounce. When a 200 N child sits on the toy, it compresses 5 mm downward. What is the ride's spring constant?
    (A) 5 mm
    (B) 1000 N
    (C) 1000 N/m
    (D) 40000 N/m

14. The coefficient of restitution for a particular ball is 0.45. If the ball hits a surface traveling at 100 m/s its rebound speed will be
    (A) 45 m/s^2
    (B) 90 m/s
    (C) 100 m/s
    (D) 45 m/s

15. You are riding an amusement park ride where you are strapped to the inside of a giant metal wheel that is rotating quite rapidly. Your acceleration is
    (A) Zero
    (B) Straight down
    (C) Straight up
    (D) Toward the center

16. You are swinging a tin can around your head in a perfectly horizontal circle of radius 4 m. (This is really not possible but we're saying it almost happens.) If the speed of the can is 4 m/s what is its acceleration?
    (A) 4 m/s
    (B) 4 m/s^2
    (C) 16 m/s^2
    (D) 1/4 m/s^2