AUC Physics

Name_____

1) A torque acting on an object tends to produce 1) _____
A) equilibrium.
B) rotation.
C) linear motion.
D) velocity.
E) a center of gravity.

2) A swimming area in a rotating space habitat is located in a region of 1/4 *g*. If a diver can jump 1 m high in a 1–*g* region, how high can the same diver jump in the swimming area? 2) _____
A) 1 m
B) 2 m
C) 4 m
D) 16 m
E) more than 16 m

3) A tightrope walker more easily balances on a tight wire if her pole 3) _____
A) is held high. B) droops. C) is short but heavy.

4) Strictly speaking, to weigh less in the Northern Hemisphere, you should move to a location farther 4) _____
A) north (toward the pole). B) south (toward the equator).
C) east. D) west.

5) If Alex wishes to rotate his skateboard, then he must apply a 5) _____
A) torque.
B) rotational maneuver.
C) pause before bearing down on the board.

6) If you're on a Ferris wheel at a carnival, seated 10 m from the Ferris wheel's axis that makes a complete rotation each minute, your linear speed is 6) _____
A) 10 m/min.
B) 31.4 m/min.
C) 62.8 m/min.
D) 100 m/min.
E) need more information

7) Horses with the greatest linear speed on a merry-go-round are located 7) _____
A) near the center.
B) near the outside.
C) anywhere, because they all move at the same speed.

8) The famous Leaning Tower of Pisa doesn't topple over because its center of gravity is 8) _____
A) relatively low for such a tall building.
B) stabilized by its structure.
C) displaced from its center.
D) above a place of support.
E) in the same place as its center of mass.

9) You can swing your legs to and fro more frequently when your legs are 9) _____
A) straight. B) bent. C) same either way

10) The tapered shape of the wheel rims that ride on railroad tracks allows opposite wheels to 10) _____
A) in effect, vary their diameters.
B) travel at different linear speeds for the same rotational speed.
C) both of these
D) none of these

11) Consider two flywheels of the same size and shape, but one with twice the mass. Rotational inertia of the more massive one is 11) _____
A) two times greater. B) four times greater.
C) the same as the other one. D) half.

12) Which of these has its center of mass where no mass exists? 12) _____
A) baseball B) golf ball
C) basketball D) none of the above

13) A 1-kg rock is suspended from the tip of a horizontal meterstick at the 0-cm mark so that the meterstick barely balances like a seesaw when its fulcrum is at the 12.5-cm mark. From this information, the mass of the meterstick is 13) _____
A) 1/4 kg.
B) 1/2 kg.
C) 3/4 kg.
D) 1 kg.
E) none of the above

14) If the planet Jupiter underwent gravitational collapse, its rate of rotation about its axis would 14) _____
A) decrease. B) increase.
C) stay the same. D) need more information

15) For a system in mechanical equilibrium, the resultant 15) _____
A) force must be zero. B) torque must be zero.
C) both of these D) none of these

16) When a twirling ice skater brings her arms inward, her rotational speed 16) _____
A) decreases. B) remains the same. C) increases.

17) Stand a broom upright on the end of its pole and let it topple to the floor. Repeat, but with the bristles end on the floor. The faster fall will be the broom standing on its 17) _____

A) pole-end. B) bristles-end. C) the same either way.

18) The rotational inertia of your leg is greater when your leg is 18) _____

A) straight. B) bent. C) same either way

19) A solitary boy cannot balance on a seesaw with its fulcrum at its midpoint. If the fulcrum is moved to one-quarter the distance from the boy, balance is achieved when the weight of the boy is 19) _____

A) less than the weight of the seesaw. B) equal to the weight of the seesaw.

C) more than the weight of the seesaw. D) need more information

20) A vertically-held sledge hammer is easier to balance when the heavier end is 20) _____

A) on your hand.

B) at the top, away from your hand.

C) same either way