Multiple Choice

4.1 Force 25.

Which of the following is a physical quantity that can be described by dynamics but not by kinematics?

a. Velocity
b. Acceleration
c. Force

26.

Which of the following is used to represent an object in a free-body diagram?

a. A point
b. A line
c. A vector

4.2 Newton's First Law of Motion: Inertia 27.

What kind of force is friction?

a. External force
b. Internal force
c. Net force

28.

What is another name for Newton's first law?

a. Law of infinite motion
b. Law of inertia
c. Law of friction

29.

True or False—A rocket is launched into space and escapes Earth's gravitational pull. It will continue to travel in a straight line until it is acted on by another force.

a. True
b. False

30.

A 2,000-kg car is sitting at rest in a parking lot. A bike and rider with a total mass of 60 kg are traveling along a road at 10 km/h. Which system has more inertia? Why?

a. The car has more inertia, as its mass is greater than the mass of the bike.
b. The bike has more inertia, as its mass is greater than the mass of the car.
c. The car has more inertia, as its mass is less than the mass of the bike.
d. The bike has more inertia, as its mass is less than the mass of the car.

4.3 Newton's Second Law of Motion 31.

In the equation for Newton's second law, what does F_{net} stand for?

a. Internal force
b. Net external force
c. Frictional force

32.

What is the SI unit of force?

a. Kg
b. dyn
c. N

33.

What is the net external force on an object in freefall on Earth if you were to neglect the effect of air?

a. The net force is zero.
b. The net force is upward with magnitude *mg*.
c. The net force is downward with magnitude *mg*.
d. The net force is downward with magnitude 9.8 N.

34.

Two people push a 2,000-kg car to get it started. An acceleration of at least 5.0 m/s^2 is required to start the car. Assuming both people apply the same magnitude force, how much force will each need to apply if friction between the car and the road is 300 N?

a. 4850 N
b. 5150 N
c. 97000 N
d. 10300 N

4.4 Newton's Third Law of Motion 35.

One object exerts a force of magnitude F_1 on another object and experiences a force of magnitude F_2 in return. What is true for F_1 and F_2?

a. $F_1 > F_2$
b. $F_1 < F_2$
c. $F_1 = F_2$

36.

A weight is suspended with a rope and hangs freely. In what direction is the tension on the rope?

a. parallel to the rope

b. perpendicular to the rope

37.

A person weighing 55 kg walks by applying 160 N of force on the ground, while pushing a 10-kg object. If the person accelerates at 2 m/s^2, what is the force of friction experienced by the system consisting of the person and the object?

a. 30 N
b. 50 N
c. 270 N
d. 290 N

38.

A 65-kg swimmer pushes on the pool wall and accelerates at 6 m/s^2. The friction experienced by the swimmer is 100 N. What is the magnitude of the force that the swimmer applies on the wall?

a. −490 N
b. −290 N
c. 290 N
d. 490 N