Name:

1) Which two quantities are measured in the same units?

	A) mass and weight	C) weight and force
	B) velocity and acceleration	D) force and momentum
2)	Which pair of terms are vector quantities?	
	A) distance and displacement	C) speed and velocity

B) force and mass D) momentum and acceleration

3) As the unbalanced force applied to an object increases, the time rate of change of the object's momentum

A) remains the same	C) decreases
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- B) increases
- 4) A cart is uniformly accelerating from rest. The net force acting on the cart is

A) decreasing	B) constant	C) increasing	D) zero
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5) A 150.-newton force, F_1 , and a 200.-newton force, F_2 , are applied simultaneously to the same point on a large crate resting on a frictionless, horizontal surface. Which diagram shows the forces positioned to give the crate the *greatest* acceleration?



- 6) A 5.0-kilogram cart moving with a velocity of 4.0 meters per second is brought to a stop in 2.0 seconds. The magnitude of the average force used to stop the cart is
 - A) 20. newtons B) 2.0 newtons C) 4.0 newtons D) 10. newtons
- 7) A 1.2×10^3 -kilogram automobile in motion strikes a 1.0×10^{-4} -kilogram insect. As a result, the insect is accelerated at a rate of 1.0×10^2 meters per second². What is the magnitude of the force the insect exerts on the car?
 - A) 1.2×10^{-2} N B) 1.2×10^{3} N C) 1.0×10^{-2} N D) 1.0×10^{1} N
- 8) An object with a mass of 0.5 kilogram starts from rest and achieves a maximum speed of 20 meters per second in 0.01 second. What average unbalanced force accelerates this object?
 - A) 1,000 N B) 10 N C) 0.1 N D) 0.001 N
- 9) A 50.-kilogram woman wearing a seat belt is traveling in a car that is moving with a velocity of +10. meters per second. In an emergency, the car is brought to a stop in 0.50 second. What force does the seat belt exert on the woman so that she remains in her seat?
 - A) -5.0×10^{1} N B) -5.0×10^{2} N C) -1.0×10^{3} N D) -2.5×10^{1} N

10) What is the magnitude of the net force acting on a 2.0×10^3 -kilogram car as it accelerates from rest to a speed of 15 meters per second in 5.0 seconds?

A) 6.0×10^4 N B) 2.0×10^4 N C) 6.0×10^3 N D) 3.0×10^4 N

- 11) A force of 50. newtons causes an object to accelerate at 10. meters per second squared. What is the mass of the object?
 - A) 5.0 kg B) 500 kg C) 60. kg D) 0.20 kg
- 12) An object accelerates at 2.5 meters per second² when an unbalanced force of 10. newtons acts on it. What is the mass of the object?
 - A) 3.0 kg B) 1.0 kg C) 2.0 kg D) 4.0 kg
- 13) A net force of 5.0×10^2 newtons causes an object to accelerate at a rate of 5.0 meters per second². What is the mass of the object?
 - A) 2.5×10^3 kg B) 1.0×10^2 kg C) 2.0×10^{-1} kg D) 6.0×10^2 kg
- 14) A bullet traveling at 5.0×10^2 meters per second is brought to rest by an impulse of 50. newton-seconds. What is the mass of the bullet?
 - A) 1.0×10^{-1} kg B) 1.0×10^{1} kg C) 2.5×10^{4} kg D) 1.0×10^{-2} kg
- 15) In the graph below, the acceleration of an object is plotted against the unbalanced force on the object.



What is the object's mass?

A) 0.2 kg	B) 0.5 kg	C) 2 kg	D) 1 kg
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Questions 16 and 17 refer to the following:

A 10.-kilogram object, starting from rest, slides down a frictionless incline with a constant acceleration of 2.0 m/sec^2 for 4.0 seconds.

- 16) What is the approximate weight of the object?
 - A) 1 newton B) 10 newtons C) 1,000 newtons D) 100 newtons

17) To produce this acceleration, what is the force on the object?

A) 2.0×10^2 newtons B) 2.0×10^1 newtons C) 10. newtons D) 5.0 newtons

- 18) A 50.0-kilogram object in outer space is attracted to a nearby planet with a net force of 400. newtons. What is the magnitude of the object's acceleration?
 - A) 9.81 m/s^2 B) 8.00 m/s^2 C) 78.4 m/s^2 D) $2,000 \text{ m/s}^2$
- 19) Two frictionless blocks, having masses of 8.0 kilograms and 2.0 kilograms, rest on a horizontal surface. If a force applied to the 8.0-kilogram block gives it an acceleration of 5.0 m/sec², then the same force will give the 2.0-kilogram block an acceleration of
 - A) 2.5 m/sec² B) 10. m/sec² C) 1.2 m/sec² D) 20. m/sec²
- 20) A 3.0-kilogram mass weighs 15 newtons at a given point in the Earth's gravitational field. What is the magnitude of the acceleration due to the gravity at this point?
 - A) 5.0 m/s^2 B) 45 m/s^2 C) 9.8 m/s^2 D) 0.20 m/s^2
- 21) Two forces are applied to a 2.0-kilogram block on a frictionless, horizontal surface, as shown in the diagram below.

$$\begin{array}{c|c} F_1 = 2.0 \text{ N} \\ \hline 2.0 \text{ kg} \\ \hline FRICTIONLESS SURFACE \\ \end{array}$$

The acceleration of the block is

- A) 3.0 m/s^2 to the right B) 5.0 m/s^2 to the right C) 3.0 m/s^2 to the left D) 5.0 m/s^2 to the left
- 22) The graph below shows the weight of three objects on planet X as a function of their mass.



The acceleration due to gravity on planet X is approximately

- A) 50. m/s^2 B) 0.17 m/s^2 C) 9.8 m/s^2 D) 6.0 m/s^2
- 23) A 20.-kilogram mass moving at a speed of 3.0 meters per second is stopped by a constant force of 15 newtons. How many seconds must the force act on the mass to stop it?
 - A) 1.3 sec B) 5.0 sec C) 4.0 sec D) 0.20 sec