Name: _____ Date: _____

PHYSICS
Forces Review & Calculations

Part 1: Read the statements. Choose which option best describes forces or are the effects of forces.

_____ 1. Which option best describes gravity force?
A. Pull force & contact force
B. Pull force & action-at-a-distance force
C. Push force & contact force
D. Push force & action-at-a-distance force

_____ 2. Which option best describes electrostatic force when a positively-charged object is near another positive-charged object?
A. Pull force & contact force
B. Pull force & action-at-a-distance force
C. Push force & contact force
D. Push force & action-at-a-distance force

_____ 3. Which option best describes electrostatic force when a positively-charged object is near a negatively-charged object?
A. Pull force & contact force
B. Pull force & action-at-a-distance force
C. Push force & contact force
D. Push force & action-at-a-distance force

_____ 4. Which option best describes buoyancy force?
A. Pull force & contact force
B. Pull force & action-at-a-distance force
C. Push force & contact force
D. Push force & action-at-a-distance force

_____ 5. Which option best describes tension force?
A. Pull force & contact force
B. Pull force & action-at-a-distance force
C. Push force & contact force
D. Push force & action-at-a-distance force

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_____ 6. Which option best describes magnetic fields when the north pole of one magnet is near the north pole of another magnet?
A. Pull force & contact force
B. Pull force & action-at-a-distance force
C. Push force & contact force
D. Push force & action-at-a-distance force

_____ 7. Which option best describes magnetic fields when the north pole of one magnet is near the south pole of another magnet?
A. Pull force & contact force
B. Pull force & action-at-a-distance force
C. Push force & contact force
D. Push force & action-at-a-distance force

_____ 8. Which option has the greatest inertia?
A. 10 kg box
B. 20 kg box
C. 40 kg box
D. All have equal inertia

_____ 9. Which option has the greatest inertia?
A. 60 kg ball moving at 3 m/s.
B. 90 kg ball moving at 2 m/s.
C. 180 kg ball moving at 1 m/s.
D. All have equal inertia

_____ 10. Which option has the greatest inertia?
A. 60 kg ball moving at 3 m/s.
B. 60 kg ball moving at 6 m/s.
C. 60 kg ball moving at 9 m/s.
D. All have equal inertia

_____ 11. Which option will require the most amount of force to accelerate it?
A. 60 kg ball moving at 3 m/s.
B. 90 kg ball moving at 2 m/s.
C. 180 kg ball moving at 1 m/s.
D. All will require equal force.

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_____ 12 Which option will require the greatest amount of force to accelerate it?
A. 60 kg ball moving at 3 m/s.
B. 60 kg ball moving at 6 m/s.
C. 60 kg ball moving at 9 m/s.
D. All will require equal force.

_____ 13 Which option had the most force acting upon it?
A. 20 kg car accelerating by 3.0 m/s^2.
B. 20 kg car accelerating by 2.0 m/s^2.
C. 20 kg car accelerating by 1.0 m/s^2.
D. All had equal force acting upon them.

_____ 14 Which option had the most force acting upon it?
A. 20 kg car accelerating by 3.0 m/s^2.
B. 30 kg car accelerating by 2.0 m/s^2.
C. 60 kg car accelerating by 1.0 m/s^2.
D. All had equal force acting upon them.

_____ 15 Which is true about an applied force?
A. Acts parallel to the surface and in the same direction as the motion.
B. Acts parallel to the surface and in the direction opposite of the motion.
C. Acts perpendicular to the surface.
D. Acts in the down direction towards the center of Earth's mass.

_____ 16 Which is true about gravity force?
A. Acts parallel to the surface and in the same direction as the motion.
B. Acts parallel to the surface and in the direction opposite of the motion.
C. Acts perpendicular to the surface and pushes back on the object.
D. Acts in the down direction towards the center of Earth's mass.

_____ 17 Which is true about normal force?
A. Acts parallel to the surface and in the same direction as the motion.
B. Acts parallel to the surface and in the direction opposite of the motion.
C. Acts perpendicular to the surface and pushes back on the object.
D. Acts in the down direction towards the center of Earth's mass.

_____ 18 Which is true about friction force?
A. Acts parallel to the surface and in the same direction as the motion.
B. Acts parallel to the surface and in the direction opposite of the motion.
C. Acts perpendicular to the surface and pushes back on the object.
D. Acts in the down direction towards the center of Earth's mass.

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_____ 19 What does friction force do to moving objects?
A. Converts kinetic energy into potential energy.
B. Converts kinetic energy into heat.
C. Converts potential energy into kinetic energy.
D. Converts heat into potential energy.

_____ 20 What does friction force do to objects?
A. Makes moving objects go faster, or moves objects if they are initially motionless.
B. Changes objects from solid to liquid.
C. Makes objects move in the direction opposite that they already move.
D. Makes moving objects slow or stop, or keep objects motionless if they are initially motionless.

_____ 21 What does applied force do to objects?
A. Makes moving objects go faster, or moves objects if they are initially motionless.
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D. Makes moving objects slow or stop, or keep objects motionless if they are initially motionless.

_____ 22 What is a free body diagram drawing?
A. It shows all the forces that an object of reference puts on its surroundings.
B. It shows all the forces that an object of reference puts on another object.
C. It shows all the forces that an object of reference puts on its surroundings and all of the forces that are acting upon the object of reference.
D. It shows all the forces that are acting upon the object of reference.

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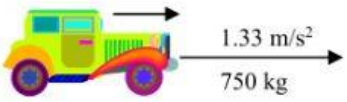
Part 2: Calculating Forces. Calculate force, acceleration, and mass. Use correct units. Type the correct answer into the small rectangle. Show calculations and work in the larger rectangle.

Force $F = m \cdot a$	**Acceleration** $a = \frac{F}{m}$	F = force (N) (net force) m = mass (kg) a = acceleration (m/s^2) $\vec{v}_0$ = initial velocity (m/s) $\vec{v}_f$ = final velocity (m/s)
Acceleration $a = \frac{\vec{v}_f - \vec{v}_0}{t}$	**Mass** $m = \frac{F}{a}$	

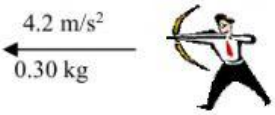


1. The motor of a car accelerates a car by 1.33 m/s^2. The mass of the car is 750 kg. Calculate the force of the motor causing the car to move.

Answer:

2. The brakes of a car accelerate the car by -1.80 m/s^2. The mass of the car is 750 kg. Calculate the force of the brakes causing the car to slow.

Answer:



3. Tyrell is an expert archer. Tyrell's bow launches an arrow with an acceleration of 4.2 m/s^2. The mass of the arrow is 0.30 kg. Calculate the force of the bow launching the arrow.

Answer:

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4. Jorge is a professional soccer player. Jorge kicks the soccer ball with a force of 11 N. The mass of the soccer ball is 1.25 kg. Calculate the acceleration experienced by the soccer ball.

Answer:

5. Alicia rearranged the furniture in her apartment. She pushed her sofa with a net force of 65 N. The mass of her sofa was 45 kg. Calculate the acceleration experienced by the sofa being pushed across the floor.

Answer:

6. A car was moving north on the freeway. It was traveling at 15 m/s. It got faster over 10 seconds time to have a final velocity of 45 m/s. The mass of the car was 1200 kg. Calculate the force of the motor accelerating the car. (Note, this is a two-step calculation).

Answer:

7. Steven was riding his bicycle very fast to get to school. He was moving at 16 m/s, but suddenly had to stop. He stopped his bike in 4.0 seconds. The mass of Steven + bike was 96 kg. Calculate the force of his brakes stopping the bike. (Note, this is a two-step calculation).

Answer:

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Part 3: Forces Vocabulary. Drag and drop the vocabulary words into the correct blanks in the paragraph.

Acceleration	Contact	Gravity	Newtons	Resistance
Accelerate	Field	Inertia	Push	Vector

1. Forces are _____ or pull interactions between two or more objects.
2. Forces can be classified as _____ forces or action-at-a-distance forces.
3. Action at a distance forces are sometimes called _____ forces.
4. _____ is an example of an action-at-a-distance force because two objects do not need to touch in order to attract each other.
5. A force will cause an object to _____ or change their state of motion.
6. The units of force are _____, named after the famous English scientist who wrote about forces in Philosophiae Principia Naturalis Mathematica.
7. A force is a _____ because it needs both magnitude and direction to be correct.
8. Forces are calculated as the product of mass multiplied by _____.
9. The property of _____ is proportional to the object's mass.
10. Inertia is an object's _____ to acceleration. Objects want to keep their original states of motion.

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