

Force and Motion Quiz Answer Key PDF

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Which forces act on a book resting on a table? (Select all that apply)

- A. Gravitational Force ✓**
- B. Normal Force ✓**
- C. Frictional Force
- D. Tension Force

What type of force opposes the motion of an object through the air?

- A. Gravitational Force
- B. Normal Force
- C. Air Resistance ✓**
- D. Tension Force

Which of Newton's Laws states that an object in motion will stay in motion unless acted upon by an external force?

- A. First Law ✓**
- B. Second Law
- C. Third Law
- D. Law of Universal Gravitation

Which simple machine consists of a wheel with a rope or chain?

- A. Lever
- B. Pulley ✓**
- C. Inclined Plane
- D. Wedge

What is the term for the energy stored in an object due to its position?

- A. Kinetic Energy
- B. Thermal Energy
- C. Potential Energy ✓**
- D. Chemical Energy

Which of the following is a scalar quantity?

- A. Velocity
- B. Force
- C. Displacement
- D. Speed ✓**

What is the formula for calculating work done?

- A. $W = F \times d$ ✓**
- B. $W = m \times a$
- C. $W = 1/2 mv^2$
- D. $W = mgh$

What is the unit of force in the International System of Units (SI)?

- A. Joule
- B. Newton ✓**
- C. Watt
- D. Pascal

Which of the following are examples of vector quantities? (Select all that apply)

- A. Speed
- B. Velocity ✓**
- C. Force ✓**
- D. Energy

How does the concept of inertia apply to seatbelt use in vehicles?

The concept of inertia applies to seatbelt use by ensuring that when a vehicle suddenly stops, the seatbelt prevents passengers from being thrown forward, which would occur due to their inertia.

What is the significance of the normal force in everyday situations? Provide an example.

The normal force is significant because it supports objects resting on surfaces, preventing them from accelerating downward due to gravity. An example is a book on a table, where the table exerts a normal force equal to the weight of the book.

Discuss the relationship between work and energy in the context of lifting an object.

When lifting an object, work is done against the gravitational force, resulting in an increase in the object's gravitational potential energy, calculated as $Work = Force \times Distance$.

Explain Newton's Third Law of Motion with a real-world example.

A real-world example of Newton's Third Law is when you jump off a small boat onto a dock; as you push down and back on the boat (action), the boat moves backward (reaction) due to the force you exert.

How do simple machines make work easier? Provide an example of a simple machine and explain its function.

Simple machines make work easier by allowing us to apply less force over a greater distance or by changing the direction of the force. For example, a lever enables a person to lift a heavy object by applying a smaller force at a longer distance from the fulcrum.

What factors affect the gravitational force between two objects? (Select all that apply)

- A. Mass of the objects ✓
- B. Distance between the objects ✓
- C. Speed of the objects
- D. Shape of the objects

Which of the following are true about an object in equilibrium? (Select all that apply)

- A. The net force is zero ✓
- B. The object must be at rest

C. The object can be moving at constant velocity ✓

D. The object experiences unbalanced forces

What are the effects of frictional force? (Select all that apply)

A. It opposes motion ✓

B. It generates heat ✓

C. It increases speed

D. It can cause wear and tear ✓

Describe how you would calculate the net force acting on an object if multiple forces are applied in different directions.

1. Identify all the forces acting on the object and their directions. 2. Break each force into its components (usually x and y directions). 3. Sum all the x components to get the total x force and all the y components to get the total y force. 4. Use the Pythagorean theorem to find the magnitude of the net force and trigonometry to find its direction.

In a free body diagram, what does the length of an arrow represent?

A. The type of force

B. The direction of force

C. The magnitude of force ✓

D. The point of application

Which of the following are characteristics of projectile motion? (Select all that apply)

A. Horizontal velocity is constant ✓

B. Vertical acceleration is constant ✓

C. Path is a straight line

D. It is affected by air resistance