What is Newton's First Law?

Worksheet

An object at rest stays at rest, and an object in motion stays in motion at constant velocity, unless acted on by a net external force: F = 0 means zero acceleration.

Questions

1. Newton's First Law is also known as the law of

A) gravity
B) inertia
C) momentum
D) action-reaction

2. If the net force on an object is zero, the object

A) always stops
B) accelerates
C) keeps constant velocity
D) speeds up

3. A ball rolling on a frictionless floor forever illustrates

A) Newton's second law
B) Newton's first law
C) Newton's third law
D) the law of gravitation

4. Which has more inertia?

A) A tennis ball
B) A bowling ball
C) Neither, inertia is the same
D) Inertia depends on speed

5. A 2 kg book rests on a table. The table pushes up with 19.6 N and gravity pulls down 19.6 N. Is the book in equilibrium?

6. A hockey puck slides on frictionless ice at 8 m/s. What is its velocity after 10 s with no forces acting?

7. A 60 N push and a 60 N friction force act on a crate in opposite directions. Does it accelerate?

8. Define: What is Newton's First Law?

9. Define: What is inertia?

10. Define: What does F = 0 mean?

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Answer Key

1. B) inertia - It's the law of inertia - resistance to a change in motion.
2. C) keeps constant velocity - F = 0 means zero acceleration, so velocity stays constant (including staying at rest).
3. B) Newton's first law - With no net force, it keeps moving at constant velocity - the law of inertia.
4. B) A bowling ball - Inertia increases with mass - the bowling ball has more.
5. F = 19.6 19.6 = 0 N Since F = 0, a = 0 the book stays at rest (Newton's first law).
6. F = 0 a = 0 Velocity stays constant: v = 8 m/s (unchanged).
7. F = 60 60 = 0 N a = F/m = 0 no, it continues at constant velocity (or stays at rest).
8. An object stays at rest or moves at constant velocity unless a net external force acts on it.
9. An object's resistance to a change in its state of motion; more mass means more inertia.
10. The net force is zero, so acceleration is zero - velocity stays constant.

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