Answer on Question #43268 – Physics – Mechanics | Kinematics | Dynamics

Question.

All statements relate with Newton's first law, EXCEPT

A. everybody continues in state of rest or uniform speed in a straight line unless acted on it zero net force
B. the tendency of the body to maintain it state is called inertia
C. uniform speed in straight line is condition of zero net force
D. mass is a measure of the inertia
E. acceleration proportional to the net force

Solution.

The first law states that if the net force (the vector sum of all forces acting on an object) is zero, then the velocity of the object is constant.

The first law can be stated mathematically as

$$\sum \mathrm{F} = 0 \rightarrow \frac{\mathrm{dv}}{\mathrm{dt}} = 0 \rightarrow \mathrm{v} = \mathrm{const}$$

This is known as uniform motion. An object continues to do whatever it happens to be doing unless a force is exerted upon it.

Newton's first law is often referred to as the law of inertia. Inertia is the resistance of any physical object to any change in its state of motion, including changes to its speed and direction. It is the tendency of objects to keep moving in a straight line at constant velocity. The mass is a measure of the inertia.

Thus, a condition necessary for the uniform motion of a particle relative to an inertial reference frame is that the total net force acting on it is zero.

So, there is no acceleration for such a motion. Acceleration relate with Newton’s second law.

Answer.

E. acceleration proportional to the net force