Print this page

4. Quiz

Some questions might have more than one correct answer.

1. Object A has twice the momentum of object B. Stopping object A requires

A. twice the force needed to stop object B
B. half the force needed to stop object B
C. twice the impulse needed to stop object B
D. half the impulse needed to stop object B
E. more than twice the force need to stop object B

2. Two identical objects A and B are moving with the same velocity. To stop object A a constant force $\vec{F}$ is applied for a time Δt. To stop object B a constant force $\vec{F}/2$ must be applied for a time:

A. Δt
B. $2\Delta t$
C. $\Delta t/2$
D. $4\Delta t$
E. $\Delta t/4$

3. When you depress the brake pedal of your car the force that slows the car is:

A. the force of your foot on the pedal
B. the force of the brake mechanism on the wheels of the car
C. the force of the engine on the drive train
D. the frictional force of the road on the tires
E. the force of the exploding fuel on the pistons

4. A particle has momentum $\vec{p}$. If its direction of travel reverses in time Δt without a change in the magnitude of its momentum, the magnitude of the average force on it is:

A. $2p/\Delta t$
B. $p/\Delta t$
C. $p/2\,\Delta t$
D. $2p$
E. p

5. If all N particles of a system have the same mass m, the same speed v, and are all moving along the same line, the magnitude of the momentum of the system:

A. must be zero
B. must be Nmv
C. must be mv
D. might be $(N-1)mv$
E. might be $(N-2)mv$

6. A system consists of four particles, each with a mass of $1\ kg$. During a time interval of $2\ s$, the velocities of the particles change as follows.

the velocity of particle 1 changes from $(5\ m/s)\,\hat{i}$ to $(8\ m/s)\,\hat{i}$

the velocity of particle 2 changes from $(3\ m/s)\,\hat{i}$ to $(7\ m/s)\,\hat{i}$

the velocity of particle 3 changes from $(6\ m/s)\ \hat{i}$ to $(2\ m/s)\ \hat{i}$

the velocity of particle 4 changes from $(9\ m/s)\ \hat{i}$ to $(2\ m/s)\ \hat{i}$

During this interval the magnitude of the average external force on the system is:

A. $1\ N$
B. $2\ N$
C. $4\ N$
D. $6\ N$
E. $8\ N$

7. A boy runs with speed v toward a stationary skateboard and jumps on it . If the mass of the skateboard is one fourth the mass of the boy then after the boy is on the skateboard his speed is:

A. v
B. $v/5$
C. $v/4$
D. $4v/5$
E. $4v/5$

8. Which quantities are the same for a collision involving two objects with unequal mass?

A. the changes in the velocities of the objects
B. the changes in the speeds of the objects
C. the impulses of the objects on each other
D. the magnitudes of the impulses of the objects on each other
E. the momenta of the objects after the collision

9. During a collision involving two objects with unequal mass, the magnitude of the change in the momentum of the more massive object is

A. greater than the magnitude of the change in the momentum of the less massive object
B. less than the magnitude of the change in the momentum of the less massive object
C. equal to the magnitude of the change in the momentum of the less massive object
D. zero
E. determined by the impulse on it

10. In a certain rocket the rate with which the rocket loses mass due to fuel ejection is proportional to the speed of the fuel relative to the rocket. If the relative speed is doubled the thrust of the rocket is:

A. the same
B. doubled
C. halved
D. four times as great
E. one-fourth as great

Answers: (10 C; (2) B; (3) D; (4) A; (5) E; (6) B; (7) D; (8) D; (9) C, D; (10) D