Extended Response

8.1 Linear Momentum, Force, and Impulse 44.

Can a lighter object have more momentum than a heavier one? How?

a. No, because momentum is independent of the velocity of the object.
b. No, because momentum is independent of the mass of the object.
c. Yes, if the lighter object's velocity is considerably high.
d. Yes, if the lighter object's velocity is considerably low.

45.

Why does it hurt less when you fall on a softer surface?

a. The softer surface increases the duration of the impact, thereby reducing the effect of the force.
b. The softer surface decreases the duration of the impact, thereby reducing the effect of the force.
c. The softer surface increases the duration of the impact, thereby increasing the effect of the force.
d. The softer surface decreases the duration of the impact, thereby increasing the effect of the force.

46.

Can we use the equation $\mathrm{F}_{\mathrm{net}} = \frac{\Delta p}{\Delta t}$ when the mass is constant?

a. No, because the given equation is applicable for the variable mass only.
b. No, because the given equation is not applicable for the constant mass.
c. Yes, and the resultant equation is $\mathrm{F} = m\mathbf{v}$
d. Yes, and the resultant equation is $\mathrm{F} = ma$

8.2 Conservation of Momentum 47.

Why does a figure skater spin faster if he pulls his arms and legs in?

a. Due to an increase in moment of inertia
b. Due to an increase in angular momentum
c. Due to conservation of linear momentum
d. Due to conservation of angular momentum

8.3 Elastic and Inelastic Collisions 48.

A driver sees another car approaching him from behind. He fears it is going to collide with his car. Should he speed up or slow down in order to reduce damage?

a. He should speed up.
b. He should slow down.
c. He should speed up and then slow down just before the collision.
d. He should slow down and then speed up just before the collision.

49.

What approach would you use to solve problems involving 2D collisions?

a. Break the momenta into components and then choose a coordinate system.
b. Choose a coordinate system and then break the momenta into components.
c. Find the total momenta in the x and y directions, and then equate them to solve for the unknown.
d. Find the sum of the momenta in the x and y directions, and then equate it to zero to solve for the unknown.