NAME: _____ **PERIOD:** _____

$p = mv$ $F\Delta t = \Delta p = mv_f - mv_i$ $m_1 v_{1i} + m_2 v_{2i} = m_1 v_{1f} + m_2 v_{2f}$

Unit 5 Prep-TEST: MOMENTUM

Multiple Choice
Identify the choice that best completes the statement or answers the question. Answer in the space provided.

____ 1 A 5 kg Household Finch moving at a velocity of 5 m/s collides with a classroom window and stops. The momentum of the finch
A decreases.
B is conserved.
C increases.
D remains the same.

____ 2 A skate board rolls up a hill at 25 m/s and then zips down the hill at 300 m/s. The momentum of the skate board
A remains the same throughout the roll.
B is greater down the hill than up the hill.
C is zero throughout the roll.
D is greater up the hill than down the hill.

____ 3 A 1.00-kg duck is flying straight up at 1.50 m/s when a hunter fires straight up. The 0.0100-kg bullet is moving 100.0 m/s when it hits the duck and stays lodged in the duck's body. What is the speed of the duck and bullet immediately after the hit?
A 1.78 m/s
B 1.64 m/s
C 1.80 m/s
D 2.48 m/s
E 1.49 m/s

____ 4 A 2 500-kg truck moving at 10.00 m/s strikes a car waiting at a traffic light, hooking bumpers. The two continue to move together at 7.00 m/s. What was the mass of the struck car?
A 1 070 kg
B 967 kg
C 1 550 kg
D 1 200 kg
E 1 730 kg

____ 5 For linear momentum to be conserved on a moving object, what must be true of the net force on the object?
A it's zero
B it's negative
C it's positive
D none of the above

____ 6 Mr. Farrin, with a mass of 50 kg, rides a trike with a mass of 1 kg at a velocity of 0.5 m/s to the north. Compare the momentum of the Mr. Farrin with the momentum of the trike.
A Mr. Farrin has a greater momentum than the trike.
B Neither Mr. Farrin nor the trike has momentum.
C The trike has a greater momentum than Mr. Farrin.
D Both Mr. Farrin and the trike have the same momentum.

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____ 7 A shopping cart with wheels, initially at rest, rolls backward across the parking lot. The magnitude of the momentum of the cart

A remained the same.
B was zero while stationary and became nonzero.
C was nonzero before rolling backwards.
D was greatest while not moving.

____ 8 Ann the Astronaut weighs 60.0 kg. She is space walking outside the space shuttle and pushes a 350-kg satellite away from the shuttle at 0.90 m/s. What speed does this give Ann as she moves toward the shuttle?

A 8.5 m/s
B 5.3 m/s
C 9.0 m/s
D 9.7 m/s
E 4.0 m/s

____ 9 A "boulder" marble strikes a 0.060 kg "cat eye" marble with a force of 5.0 N. The "boulder" remains in contact with the "cat eye" for 0.055 s. The ball was initially at rest. What is the final speed of the ball?

A 5.5 m/s
B 0.30 m/s
C 4.6 m/s
D 0.017 m/s

____ 10 A linebacker strikes a side referee with a force of 100 N (on accident of course). The linebacker is in contact with the referee for 0.10 s. What is the magnitude of the change in momentum of the referee?

A -10 kgm/s
B Medic!
C 10 kgm/s
D 1000 kgm/s

____ 11 The change of momentum in an object, is the object's

A kinetic energy.
B impluse.
C momentum.
D force.

____ 12 Two surfers, Kahuna and G-Diddy, nap near each other on their frictionless "loggers" off the Pahoehoe shore. Kahuna's mass is 48 kg and G-Diddy's mass is 55 kg. If the surfers push away from each other,

A their total momentum decreases.
B their momenta are equal but opposite.
C their total momentum doubles.
D their total momentum triples.

____ 13 A 40 kg student, ditching class, throws a rock 10 meters higher than where he is standing at the top of Mt. Palomar. What is the rock's momentum at its highest point from sea level?

A 40 kgm/s
B 0 kgm/s
C 400 kgm/s
D not enough information

____ 14 What is Superman's (80 kg) momentum as he chases an asteroid traveling at a velocity of $1.00x10^4 \, m/s$?

A $1x10^{-5} \frac{kgm}{s}$
B $8x10^{5} \frac{kgm}{s}$
C $8x10^{-5} \frac{kgm}{s}$
D $8x10^{3} \frac{kgm}{s}$

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____ 15 A flying bat applies a sudden force to a 0.5 kg baseball traveling at a velocity of 26 m/s causes the baseball to slow to a velocity of 10 m/s. (The game was in Transylvania!) What was the decrease in the momentum of the object?

A $6\ kg\frac{m}{s}$

B $9\ kg\frac{m}{s}$

C $8\ kg\frac{m}{s}$

D $7\ kg\frac{m}{s}$

____ 16 Mr. Miles, at the North Shore, is on a surfboard moving down a wave at 30 $\frac{meters}{\sec}$. The combined mass of the board and Mr. Miles is 200 kilograms. The momentum of the "Kahuna" and his board is

A $6000\ kilogram \bullet \frac{m}{s}$

B $30\ kilogram \bullet \frac{m}{s}$

C $15\ kilogram \bullet \frac{m}{s}$

D $3000\ kilogram \bullet \frac{m}{s}$

____ 17 Two objects stick together and move with the same velocity after colliding. Identify the type of collision.

A inelastic
B perfectly inelastic
C elastic
D nearly elastic

____ 18 A billiard ball collides with another billiard ball at rest. The total momentum of the balls

A is zero.
B increases.
C remains constant.
D decreases.

____ 19 60-kg Johnny Knoxville leaves a bmx jump at a velocity of 10 m/s. What is the Knoxville's momentum at that instant?

A $6\ N \bullet s$
B $600\ N \bullet s$
C $60\ N \bullet s$
D $30\ N \bullet s$

____ 20 Bobby Orr hits a 0.160 kg hockey puck with a force of 140 N. The stick remains in contact with the cue for 0.045 s. The puck was initially at rest. What is the final speed of the puck?

A 39 m/s
B 22 m/s
C 6.3 m/s
D 22.4 m/s

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____ 21 A bullet collides with an aluminum can and puts a hole in it. The bullet loses some kinetic energy, which isn't transferred to the can. Identify the type of collision.

A inelastic
B elastic
C perfectly inelastic
D nearly elastic

____ 22 Which has a greater momentum—an offensive tackle with a mass of 225 kg moving at a speed of 5 m/s or a defensive corner-back with a mass of 121 kg moving at a speed of 10 m/s?

A Neither has any momentum
B The tackle has a greater momentum
C The corner-back has a greater momentum
D They both have the same momentum

____ 23 In what type of collision is kinetic energy also conserved?

A if potential energy converts to work energy.
B in elastic collisions.
C if one of the objects was initially at rest.
D in inelastic collisions.

____ 24 A person falling out of a highrise building is likely to die. However, in movies when they land in a pool they often survive. This is because the water

A increases the time for which the force acts on the person.
B reduces the momentum of the person.
C reduces the change of momentum of the person.
D reduces the impulse acting on the person.

____ 25 A 3 kg box, moving at 3 m/s, collides and sticks to a second box, initially at rest. After the collision, the boxes move together at 1 m/s. What is the mass of the second box?

A 4 kg
B 9 kg
C 6 kg
D 8 kg

____ 26 A railroad flatcar of mass 3,000 kilograms rolls to the right at 10 meters per second and collides with a flatcar of mass 2,000 kilograms that is rolling to the left at 5 meters per second. The flatcars couple together. Their speed after the collision is

A 1 m/s
B 4 m/s
C 5 m/s
D 7 m/s