

# McRoberts Secondary

Momentum Test 2025-10-27

## Personal Data

Family Name:

Given Name:

Signature:

## Registration Number

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0	<input type="checkbox"/>	0						
1	<input type="checkbox"/>	1						
2	<input type="checkbox"/>	2						
3	<input type="checkbox"/>	3						
4	<input type="checkbox"/>	4						
5	<input type="checkbox"/>	5						
6	<input type="checkbox"/>	6						
7	<input type="checkbox"/>	7						
8	<input type="checkbox"/>	8						
9	<input type="checkbox"/>	9						

In this section **no** changes or modifications must be made!

## Scrambling

0 0

Type  
020

Exam ID(Physics 12)  
25102700001

Please mark the boxes carefully:  Not marked:  or

This document is scanned automatically. Please keep clean and do not bend or fold. For filling in the document please use a **blue or black pen**.

**Only clearly marked and positionally accurate crosses will be processed!**

## Answers 1 - 15

	a	b	c	d
1	<input type="checkbox"/>	<input type="checkbox"/>		
2	<input type="checkbox"/>	<input type="checkbox"/>		
3	<input type="checkbox"/>	<input type="checkbox"/>		
4	<input type="checkbox"/>	<input type="checkbox"/>		
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6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Answers 16 - 20

	a	b	c	d
16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

a b c d





1. True or false? Kinetic energy is conserved in all collisions.
  - a. True
  - b. False
2. True or false? Momentum is conserved in both elastic and inelastic collisions.
  - a. True
  - b. False
3. True or false? Momentum is conserved when two objects collide and stick together.
  - a. True
  - b. False
4. True or false? Kinetic energy is conserved when two objects collide and stick together.
  - a. True
  - b. False
5. The area under a force-time graph represents
  - a. work
  - b. momentum
  - c. impulse
  - d. kinetic energy
6. Consider two balls of equal mass moving at different speeds. Ball 1 has double the momentum of ball 2. How does the kinetic energy of ball 1,  $KE_1$ , compare to the kinetic energy of ball 2,  $KE_2$ ?
  - a.  $KE_1 = KE_2$
  - b.  $KE_1 = \sqrt{2}KE_2$
  - c.  $KE_1 = 2KE_2$
  - d.  $KE_1 = 4KE_2$
7. A small car collides with a large truck in a head-on collision. Which of the following statements concerning the magnitude of the average collision force is correct?
  - a. The truck experiences the greater average force.
  - b. The car experiences the greater average force.
  - c. The car and the truck experience the same average force.
  - d. Cannot be determined because the masses and velocities are not given.
8. A very light object moving to the right collides with a very heavy object at rest. After the collision, the heavy object moves to the right with a small speed, and the light object moves to the left. Which object experienced the greater magnitude of impulse during the collision?
  - a. The heavy object.
  - b. The light object.
  - c. Both objects experienced the same magnitude of impulse.
  - d. Cannot be determined from the information given.
9. Two objects collide and stick together. Linear momentum is
  - a. conserved only if there is no friction.
  - b. definitely conserved.
  - c. definitely not conserved.
  - d. conserved only if the collision is elastic.

10. A very heavy ball rolling with speed  $v$  collides with a very light ball at rest. If the collision is elastic, then the light ball's speed after the collision is approximately
- $v/2$
  - $v$
  - $2v$
  - $3v$
11. A very light ball rolling with speed  $v$  collides with a very heavy ball at rest. If the collision is elastic, then the light ball's speed after the collision is approximately
- 0
  - $v/2$
  - $v$
  - $2v$
12. Two objects collide and bounce apart. Linear momentum is
- definitely conserved.
  - conserved only if there is no friction.
  - conserved only if the collision is elastic.
  - definitely not conserved.
13. A ball of mass 830 g, moving horizontally with speed 19 m/s strikes a wall and rebounds at 18 m/s. What is the magnitude of the change in momentum of the ball?
- 13.9 kg m/s
  - 25.3 kg m/s
  - 30.7 kg m/s
  - 30 700 kg m/s
14. A machine gun, of mass 11 kg, fires bullets of mass 20 g, with a muzzle speed of 698 m/s, at the rate of 925 rounds per minute. What is the average force exerted on the machine gun mount?
- 215 N
  - 130 N
  - 215000 N
  - 12900 N
15. A ball of mass 11 g is dropped from a height of 6 m. Its momentum just before it strikes the ground is
- 66 kg m/s
  - 0.09 kg m/s
  - 0.12 kg m/s
  - 0.07 kg m/s
16. A ball of mass  $m$  rolls with speed  $v$  towards another ball of mass  $(2/13)m$  at rest. If the collision is completely inelastic, what is the speed of the combined mass after the collision?
- $(2/15)v$
  - $(2/13)v$
  - $(13/15)v$
  - $(13/2)v$

17. A proton at rest is struck head-on by an alpha particle (which consists of 2 protons and 2 neutrons) moving at speed  $v$ . If the collision is completely elastic, what speed will the alpha particle have after the collision? Assume that the neutron's mass is equal to the proton's mass.
- $(5/3)v$
  - $(3/5)v$
  - $(1/4)v$
  - $(1/5)v$
18. Object 1 and Object 2 have the same momentum. The ratio of Object 1's mass to Object 2's mass is  $m_1/m_2 = 4/9$ . What is the ratio of Object 1's kinetic energy to Object 2's kinetic energy,  $KE_1/KE_2$ ?
- $4/9$
  - $81/16$
  - $9/4$
  - $16/81$
19. A bullet (70 g) is fired into the wooden block (9.00 kg) of a ballistic pendulum. As a result, the bullet is lodged into the block, and the centre of mass of the pendulum-projectile system swings up to a maximum height of 65 cm. What was the initial speed of the bullet?
- 600 m/s
  - 462 m/s
  - 651 m/s
  - 865 m/s
20. A car of mass 1310 kg, traveling with a velocity 35 km/h, strikes a parked truck of mass 11790 kg head-on. The bumpers lock together in this completely inelastic collision. What fraction of the initial kinetic energy is lost in the collision?
- $1/81$
  - $1/9$
  - $1/10$
  - $9/10$