



# McRoberts Secondary



Momentum Test 2025-10-27

## Personal Data

Family Name:	
Given Name:	
Signature:	
	checked

## Registration Number

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4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
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7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9

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

Scrambling

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Type

020

Exam ID(Physics 12)

25102700002

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"/>		
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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"/>
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	a	b	c	d

## 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? Momentum is conserved in both elastic and inelastic collisions.
  - a. True
  - b. False
2. True or false? Momentum is conserved when two objects collide and stick together.
  - a. True
  - b. False
3. True or false? Kinetic energy is conserved in all collisions.
  - 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. kinetic energy
  - b. momentum
  - c. work
  - d. impulse
6. 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.
7. Two equal mass balls, one red and one blue, are dropped from the same height, and bounce off the floor. The red ball bounces higher than the blue ball. Which ball is subjected to the greater magnitude of impulse during its collision with the floor?
  - a. It depends on the elasticity of the collisions.
  - b. The red ball.
  - c. The blue ball.
  - d. Both balls were subjected to the same impulse.
8. An object of mass  $m$  is moving with momentum  $p$ . Which of the following represents its kinetic energy?
  - a.  $p^2/(2m)$
  - b.  $mp^2/2$
  - c.  $mp$
  - d.  $mp/2$
9. 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
  - a.  $v/2$
  - b.  $v$
  - c.  $2v$
  - d.  $3v$

10. 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
  - $v/2$
  - $v$
  - $2v$
11. Two objects collide and bounce apart. Linear momentum is
- definitely not conserved.
  - conserved only if the collision is elastic.
  - conserved only if there is no friction.
  - definitely conserved.
12. Two objects collide and bounce apart. Kinetic energy is
- conserved only if there is no friction.
  - definitely conserved.
  - definitely not conserved.
  - conserved only if the collision is elastic.
13. A ball of mass 48 g is dropped from a height of 5 m. Its momentum just before it strikes the ground is
- 480 kg m/s
  - 0.48 kg m/s
  - 180 kg m/s
  - 390 kg m/s
14. A fire hose is turned on the door of a burning building in order to knock it down. This requires a force of 1330 N. If the hose delivers 15 kg / s, what is the velocity of water needed, assuming that the water doesn't bounce back?
- 74 m/s
  - 170 m/s
  - 110 m/s
  - 89 m/s
15. A ball of mass  $m$  rolls with speed  $v$  towards another ball of mass  $(1/17)m$  at rest. If the collision is completely inelastic, what is the speed of the combined mass after the collision?
- $(17/18)v$
  - $(1/18)v$
  - $(17/1)v$
  - $(1/17)v$
16. A ball of mass 440 g, moving horizontally with speed 15 m/s strikes a wall and rebounds at 12 m/s. What is the magnitude of the change in momentum of the ball?
- 11 900 kg m/s
  - 3.6 kg m/s
  - 9.98 kg m/s
  - 11.9 kg m/s

17. Object 1 and Object 2 have the same momentum. The ratio of Object 1's mass to Object 2's mass is  $m_1/m_2 = 1/2$ . What is the ratio of Object 1's kinetic energy to Object 2's kinetic energy,  $KE_1/KE_2$ ?
- 1/2
  - 1/4
  - 2/1
  - 4/1
18. A skater of mass 82 kg skates at speed 2 m/s towards another skater of mass 43 kg who is standing still with open arms. If the skaters hold on to each other after they collide, with what speed do they both move off together?
- 0.83 m/s
  - 1.17 m/s
  - 1.31 m/s
  - 1.01 m/s
19. 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.
- $(5/3)v$
  - $(3/5)v$
  - $(1/4)v$
  - $(1/5)v$
20. A bullet (17 g) is fired into the wooden block (7.00 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 61 cm. What was the initial speed of the bullet?
- 1880 m/s
  - 2650 m/s
  - 1430 m/s
  - 850 m/s