

Brett Robbins Academic Consulting

Physics 20 Practice Test

Unit A: Kinematics

25 Questions

Original practice questions written to the Alberta curriculum, in the style of past diploma examinations. Work through each question, then check your answers with the key at the end.

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, contact Brett for clarification.

Question 1

Which of the following quantities is a vector?

- | | |
|-----------------|----------|
| A) Distance | B) Speed |
| C) Displacement | D) Time |

Question 2

A car travels 240 m in 12 s at a constant speed.

The speed of the car is

- | | |
|--------------|-------------|
| A) 0.050 m/s | B) 20 m/s |
| C) 2.0 m/s | D) 2880 m/s |

Question 3

An object moves 45 m [E] in 9.0 s at a constant velocity.

Its velocity, in metres per second, is

Question 4

A car moving east slows down from 20 m/s to 8 m/s in 3.0 s.

Taking east as positive, the acceleration of the car is

- | | |
|----------------------------|-----------------------------|
| A) 4.0 m/s^2 [W] | B) 4.0 m/s^2 [E] |
| C) 9.3 m/s^2 [W] | D) 0.25 m/s^2 [W] |

Question 5

On a position–time graph of an object moving in a straight line,
the slope of the graph represents the objects

- | | |
|-----------------|-----------------|
| A) Displacement | B) Acceleration |
| C) Speed | D) Velocity |

Question 6

A velocity–time graph shows an objects velocity increasing uniformly
from 0 to 12 m/s over the first 6.0 s of its motion.

The displacement of the object during these 6.0 s is

- | | |
|----------|---------|
| A) 2.0 m | B) 72 m |
| C) 36 m | D) 18 m |

Question 7

A car starts from rest and accelerates uniformly at 3.5 m/s^2 for 6.0 s.

The distance travelled, in metres, to the nearest metre, is

Question 8

An object is dropped from rest from a tall building. Use $g = 9.81 \text{ m/s}^2$
and ignore air resistance. The speed of the object after 3.0 s is

- | | |
|-----------|------------|
| A) 29 m/s | B) 3.3 m/s |
| C) 44 m/s | D) 88 m/s |

Question 9

A hiker walks 5.0 km east, then turns and walks 12 km north.

The magnitude of the hikers total displacement is

- | | |
|-----------|----------|
| A) 7.0 km | B) 13 km |
| C) 17 km | D) 60 km |

Question 10

A train moving at 12 m/s accelerates uniformly at 0.80 m/s^2 over a distance of 200 m. Its final speed, in metres per second, to the nearest tenth, is

Question 11

A ball rolls off the edge of a table 1.25 m above the floor with a horizontal speed of 2.0 m/s. Use $g = 9.81 \text{ m/s}^2$. The ball lands a horizontal distance from the base of the table of approximately

- | | |
|-----------|-----------|
| A) 0.25 m | B) 4.0 m |
| C) 1.0 m | D) 0.50 m |

Question 12

A projectile is launched from ground level at 20 m/s at an angle of 30° above the horizontal and lands at the same height. Use $g = 9.81 \text{ m/s}^2$. The time the projectile is in the air, in seconds, to the nearest tenth, is

Question 13

A projectile is launched from ground level at 20 m/s at an angle of 30° above the horizontal and lands at the same height. Use $g = 9.81 \text{ m/s}^2$.

The horizontal range of the projectile is approximately

- | | |
|---------|---------|
| A) 35 m | B) 18 m |
| C) 41 m | D) 71 m |

Question 14

A boat heads directly across a river, moving at 4.0 m/s relative to the water, perpendicular to the current. The river flows at 3.0 m/s.

The speed of the boat relative to the shore is

- | | |
|------------|------------|
| A) 7.0 m/s | B) 1.0 m/s |
| C) 3.5 m/s | D) 5.0 m/s |

Question 15

A car travelling at 25 m/s brakes uniformly with an acceleration of magnitude 5.0 m/s^2 until it stops. The distance travelled while braking, in metres, is

Question 16

An objects velocity–time graph is a horizontal line at 6 m/s from 0 to 4 s, then decreases uniformly, reaching 0 m/s at 10 s. The total displacement of the object over the 10 s is

- | | |
|---------|---------|
| A) 24 m | B) 42 m |
| C) 60 m | D) 36 m |

Question 17

A ball is launched at 15 m/s at an angle of 53° above the horizontal.

Use $g = 9.81 \text{ m/s}^2$. The maximum height reached above the launch point is

- | | |
|----------|----------|
| A) 11 m | B) 4.3 m |
| C) 7.3 m | D) 23 m |

Question 18

A car accelerates from rest at 2.0 m/s^2 for 5.0 s, then continues at a constant speed for another 10 s. The total distance travelled, in metres, is

Question 19

A ball is thrown straight up into the air at 14 m/s. Use $g = 9.81 \text{ m/s}^2$ and ignore air resistance. The maximum height reached by the ball is closest to

- | | |
|---------|----------|
| A) 10 m | B) 5.0 m |
| C) 14 m | D) 20 m |

Question 20

Two cars on a straight road are 300 m apart and drive directly toward each other, one at 20 m/s and the other at 25 m/s, both at constant speeds.

The time until the cars meet is

- | | |
|----------|----------|
| A) 12 s | B) 15 s |
| C) 3.8 s | D) 6.7 s |

Question 21

An objects velocity decreases uniformly from + 10 m/s to - 10 m/s over a time interval of 8.0 s. The displacement of the object during this interval is

- | | |
|---------|----------|
| A) 40 m | B) 0 m |
| C) 80 m | D) -40 m |

Question 22

A relief package is dropped from a plane flying horizontally at 40 m/s at a height of 490 m above the ground. Use $g = 9.81 \text{ m/s}^2$ and ignore air resistance. The horizontal distance the package travels before it hits the ground, to the nearest ten metres, is

Question 23

A soccer ball is kicked at 18 m/s at an angle of 40° above the horizontal. The vertical component of the balls initial velocity is

- A) 18 m/s
- B) 14 m/s
- C) 12 m/s
- D) 28 m/s

Question 24

A velocity–time graph for an object is a straight line passing through the points (0 s, 4 m/s) and (8 s, 20 m/s). The acceleration of the object is

- A) 2.0 m/s^2
- B) 0.50 m/s^2
- C) 2.5 m/s^2
- D) 3.0 m/s^2

Question 25

Taking east as positive, a car travels west at a constant speed and then brakes to a stop. While the car is braking, its velocity and acceleration are

- A) Velocity positive, acceleration positive
- B) Velocity positive, acceleration negative
- C) Velocity negative, acceleration negative
- D) Velocity negative, acceleration positive

Answer Key

- | | | |
|--------|----------|---------|
| 1. C | 10. 21.5 | 19. A |
| 2. B | 11. C | 20. D |
| 3. 5.0 | 12. 2.0 | 21. B |
| 4. A | 13. A | 22. 400 |
| 5. D | 14. D | 23. C |
| 6. C | 15. 62.5 | 24. A |
| 7. 63 | 16. B | 25. D |
| 8. A | 17. C | |
| 9. B | 18. 125 | |

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