McRoberts Secondary

Kinematics Retest 4 2025-01-20

Personal Data

Family Name:

Given Name:

Signature:

checked

Registration Number

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

Scrambling 0 0

Type: 025

Exam ID(Physics 11): 25012000002

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	☐	☐		
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13	☐	☐	☐	☐
14	☐	☐	☐	☐
15	☐	☐	☐	☐
	a	b	c	d

Answers 16 - 25

	a	b	c	d
16	☐	☐	☐	☐
17	☐	☐	☐	☐
18	☐	☐	☐	☐
19	☐	☐	☐	☐
20	☐	☐	☐	☐
21	☐	☐	☐	☐
22	☐	☐	☐	☐
23	☐	☐	☐	☐
24	☐	☐	☐	☐
25	☐	☐	☐	☐
	a	b	c	d

1. True or false? When you throw a ball over to your friend, the ball's velocity is zero when it reaches its maximum height.

    a. True

    b. False

2. True or false? The area under a velocity-time graph is the displacement.

    a. True

    b. False

3. True or false? If an object changes direction, then the line on its velocity-time graph must have a changing slope.

    a. True

    b. False

4. True or false? If the velocity vector and the acceleration vector both point in the same direction, then the object must be speeding up.

    a. True

    b. False

5. True or false? If an object is moving to the right, then its acceleration must also be to the right.

    a. True

    b. False

6. An athlete throws a javelin at four different angles above the horizontal, each with the same speed: $30°$, $40°$, $60°$, $80°$. Which two throws cause the javelin to land the same distance away?

    a. $30°$ and $80°$

    b. $40°$ and $80°$

    c. $40°$ and $60°$

    d. $30°$ and $60°$

7. Suppose that several projectiles are launched. Which one will be in the air for the longest time?

    a. The one with the furthest horizontal range.

    b. The one with the greatest maximum height.

    c. The one with the greatest initial speed.

    d. None of the above.

8. A car traveling at speed v is able to stop in a distance d. Assuming the same constant acceleration, what distance does this car require to stop when it is traveling at speed $2v$?

    a. $4d$

    b. $2d$

    c. d

    d. $\sqrt{2}d$

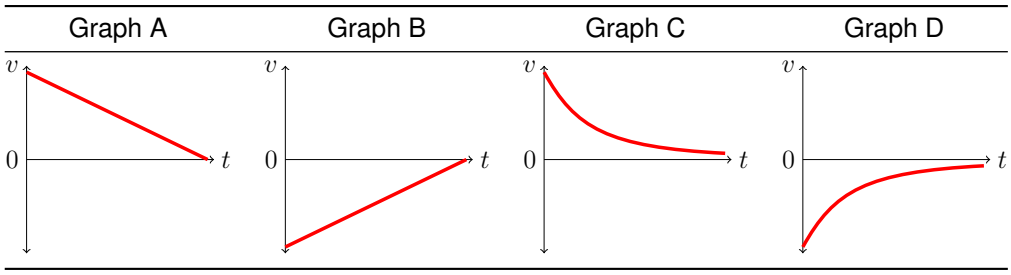
9. Ball 1 is dropped from the top of a building. One second later, ball 2 is dropped from the same building. If air resistance can be ignored, then as time progresses (and while the balls are still in free fall), the difference in their speeds

   a. increases.
   b. remains constant.
   c. decreases.
   d. cannot be determined from the given information.

10. A football is kicked with a velocity of 25 m/s at an angle of $45°$ above the horizontal. What is the vertical component of its acceleration as it travels along its trajectory? (Ignore air resistance.)

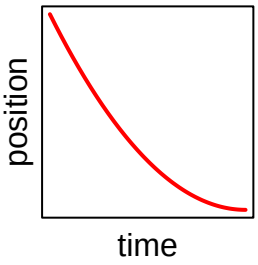
    a. $g\sin(45°)$ upward
    b. $g\sin(45°)$ downward
    c. g upward
    d. g downward

11. Which velocity-time graphs represent the motion of an object that is slowing down? *Select all that apply.*



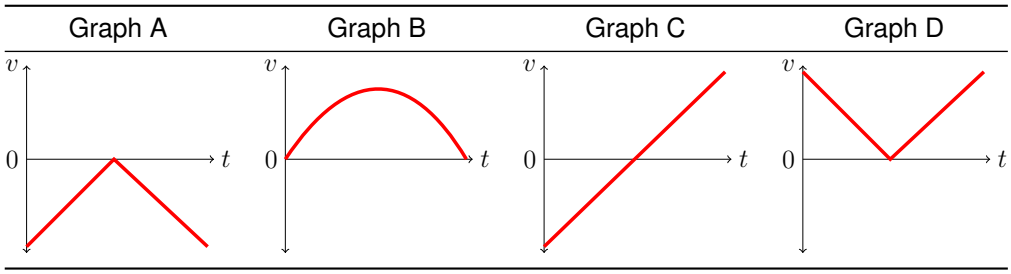
    a. Graph A
    b. Graph B
    c. Graph C
    d. Graph D

12. Which choice best matches the given position-time graph?



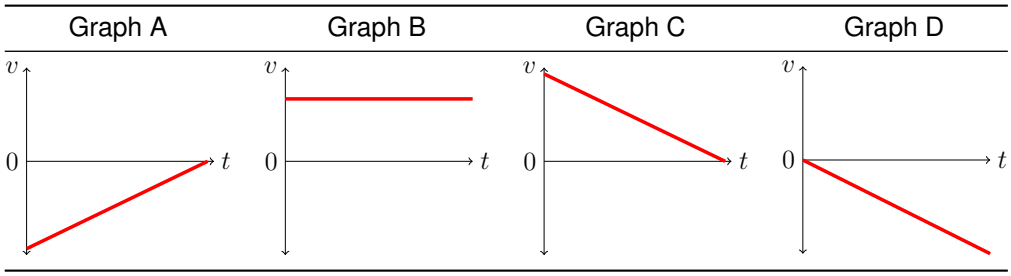
    a. moving to the right and speeding up.
    b. moving to the right and slowing down.
    c. moving to the left and speeding up.
    d. moving to the left and slowing down.

13. Which velocity-time graph represents the motion of an object that changes its direction?



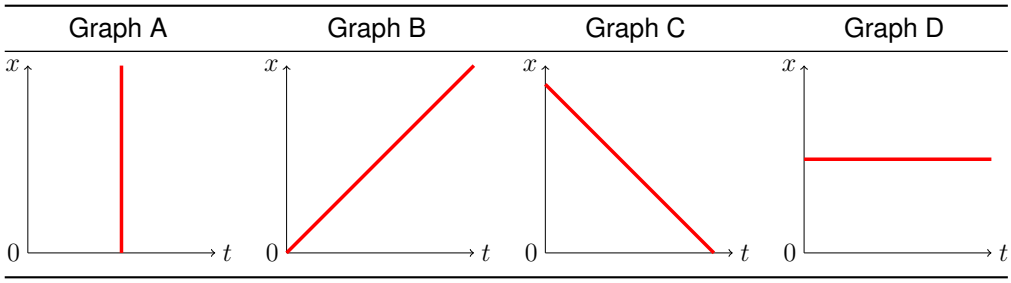
a. Graph A
b. Graph B
c. Graph C
d. Graph D

14. Which velocity-time graph represents motion with constant positive acceleration?



a. Graph A
b. Graph B
c. Graph C
d. Graph D

15. Which position-time graph represents an object at rest?



a. Graph A
b. Graph B
c. Graph C
d. Graph D

16. A particle initially moving with a velocity of $2\,\mathrm{m/s}$ in the x-direction experiences a constant acceleration of $1\,\mathrm{m/s^2}$ in the x-direction and $-2\,\mathrm{m/s^2}$ in the y-direction. What are the velocity components of the particle after $4\,\mathrm{s}$?

a. $v_x = 4\,\mathrm{m/s}, v_y = -8\,\mathrm{m/s}$
b. $v_x = -6\,\mathrm{m/s}, v_y = 4\,\mathrm{m/s}$
c. $v_x = 6\,\mathrm{m/s}, v_y = -8\,\mathrm{m/s}$
d. $v_x = 3\,\mathrm{m/s}, v_y = -2\,\mathrm{m/s}$

17. A car travels $20\,\mathrm{km}$ at $31\,\mathrm{km/h}$ and $261\,\mathrm{km}$ at $106\,\mathrm{km/h}$. What is the average speed for this trip?

    a. $101\,\mathrm{km/h}$
    b. $96\,\mathrm{km/h}$
    c. $90\,\mathrm{km/h}$
    d. $106\,\mathrm{km/h}$

18. A car accelerates from $47\,\mathrm{km/h}$ to $81\,\mathrm{km/h}$, at an average rate of $6\,\mathrm{m/s^2}$. How much time does it take to complete this speed increase?

    a. $0.62\,\mathrm{s}$
    b. $1.57\,\mathrm{s}$
    c. $14.2\,\mathrm{s}$
    d. $5.67\,\mathrm{s}$

19. An F1 car accelerates from 0 to 60 miles per hour in $2.53\,\mathrm{s}$. What is the acceleration of the car in SI units? ($1\,\mathrm{mile} = 1609.34\,\mathrm{m}$)

    a. $19.2\,\mathrm{m/s^2}$
    b. $10.6\,\mathrm{m/s^2}$
    c. $22.6\,\mathrm{m/s^2}$
    d. $18.2\,\mathrm{m/s^2}$

20. Suppose an object travels at a constant velocity of $27.0\,\mathrm{km/h}$. What distance would it travel in $23.0\,\mathrm{minutes}$?

    a. $621\,\mathrm{km}$
    b. $210\,\mathrm{km}$
    c. $10.4\,\mathrm{km}$
    d. $452\,\mathrm{km}$

21. A person throws a rock straight down from a bridge with an initial speed of $28.6\,\mathrm{m/s}$. It falls $14.7\,\mathrm{m}$ to the water below. How much time does it take for the rock to hit the water?

    a. $0.65\,\mathrm{s}$
    b. $0.48\,\mathrm{s}$
    c. $0.37\,\mathrm{s}$
    d. $0.66\,\mathrm{s}$

22. A ball tossed straight up returns to its starting point in $5.93\,\mathrm{s}$. What was its initial speed? Ignore air resistance.

    a. $34.4\,\mathrm{m/s}$
    b. $30.2\,\mathrm{m/s}$
    c. $43.5\,\mathrm{m/s}$
    d. $29.1\,\mathrm{m/s}$

23. A golf ball is hit with an initial velocity of $69\,\mathrm{m/s}$ at an angle of 33° above the horizontal. What is its range (horizontal distance before hitting the ground)? Ignore air resistance and assume a flat golf course.

    a. $233\,\mathrm{m}$
    b. $444\,\mathrm{m}$
    c. $645\,\mathrm{m}$
    d. $632\,\mathrm{m}$

24. A person throws a rock horizontally, with an initial velocity of $12\,\mathrm{m/s}$, from a bridge. It falls $7.04\,\mathrm{m}$ to the water below. How far does it travel horizontally before striking the water?

    a. $14.3\,\mathrm{m}$

    b. $12.7\,\mathrm{m}$

    c. $14.4\,\mathrm{m}$

    d. $19.9\,\mathrm{m}$

25. What is the maximum height reached by a ball thrown straight up with an initial velocity of $16.3\,\mathrm{m/s}$? Assume that the ball is thrown on the surface of the Earth and that it undergoes constant acceleration due to gravity (ignore air resistance).

    a. $9.1\,\mathrm{m}$

    b. $11.7\,\mathrm{m}$

    c. $13.6\,\mathrm{m}$

    d. $7\,\mathrm{m}$