MASSACHUSETTS PHYSICS · UNIT 1 · 25 QUESTIONS

Kinematics and Dynamics — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **A car starts from rest and accelerates at 3 $\frac{m}{s^2}$ for 4 s. Its final speed is**



A. 7 m/s

B. 12 m/s

C. 0.75 m/s

D. 1.33 m/s

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Flag a mistake

2 An object moves with initial speed 5 m/s and acceleration 2 $\frac{m}{s^2}$ for 3 s. Its displacement is

- **A** 24 m
- **B** 15 m
- **C** 33 m
- **D** 39 m

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3 An object starts from rest and accelerates at 4 $\frac{m}{s^2}$ over a distance of 18 m. Its final speed is

- **A** 6 m/s
- **B** 9 m/s
- **C** 18 m/s
- **D** 12 m/s

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4

Use $g = 10 \frac{m}{s^2}$. An object dropped from rest falls for 2 s. The distance it falls is

A 10 m

B 40 m

C 20 m

D 5 m

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5 **Use $g = 10 \frac{m}{s^2}$. A red apple dropped from rest falls for 3 s. Its speed then, in meters per second, is _____**



ANSWER _____

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6 **A projectile has horizontal speed 20 m/s and stays in the air for 3 s. Its horizontal range is**

- **A** 20 m
- **B** 40 m
- **C** 60 m
- **D** 80 m

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7 **Use g = 10 $\frac{m}{s^2}$. A ball is thrown upward with vertical speed 20 m/s. The time to reach its highest point is**

- **A** 1 s
- **B** 2 s
- **C** 4 s
- **D** 10 s

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8 **A net force of 15 N acts on a 5 kg object. Its acceleration is**

- **A** $75\ \frac{m}{s^2}$
- **B** $0.33\ \frac{m}{s^2}$
- **C** $20\ \frac{m}{s^2}$
- **D** $3\ \frac{m}{s^2}$

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9 **Use g = 10 $\frac{m}{s^2}$. The weight of an 8 kg object is**

- **A** 0.8 N
- **B** 80 N
- **C** 18 N
- **D** 800 N

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10 **A wooden crate slides across a floor. The coefficient of kinetic friction is 0.4 and the normal force is 50 N. The kinetic friction force is**



A 20 N

B 90 N

C 125 N

D 10 N

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11 **Forces of 30 N east and 10 N west act on an object. The net force is**

A 40 N east

B 40 N west

C 20 N west

D 20 N east

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12 **The property that measures an object resistance to a change in its motion is its**

A weight

B volume

C mass

D density

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13 **When two objects interact, the forces they exert on each other are**

A equal in size and opposite in direction

B equal in size and direction

C opposite in size and direction

D unrelated to each other

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14 **On a velocity time graph, the slope of the line gives the**

A displacement

B acceleration

C average speed

D net force

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15 **On a position time graph for a cyclist, the slope of the line gives the**



A acceleration

B force

C velocity

D momentum

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16 **An object moves at constant velocity. The net force on it is**

- **A** zero
- **B** in the direction of motion
- **C** opposite the motion
- **D** equal to its weight

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17 **An object moves in a circle at speed 10 m/s with radius 20 m. Its centripetal acceleration is**

- **A** $0.5\ \frac{m}{s^2}$
- **B** $2\ \frac{m}{s^2}$
- **C** $200\ \frac{m}{s^2}$
- **D** $5\ \frac{m}{s^2}$

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18 **A 2 kg object moves in a circle at speed 6 m/s with radius 3 m. The centripetal force is**

- **A** 12 N
- **B** 36 N
- **C** 24 N
- **D** 4 N

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19 **An object of weight 100 N sits on a ramp at 30 degrees to the horizontal. The component of weight down the ramp is**

- **A** 100 N
- **B** 50 N
- **C** 25 N
- **D** 200 N

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20 **A car moving at 20 m/s brakes with acceleration -5 $\frac{m}{s^2}$. The stopping distance, in meters, is _____**



ANSWER _____

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21 **An object travels 120 m in 10 s. Its average speed, in meters per second, is _____**

ANSWER _____

Understand It with Pulse | Flag a mistake

22 **An object speeds up from 0 m/s to 30 m/s in 5 s. Its average acceleration, in meters per second squared, is _____**

ANSWER _____

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23 **A net force of 20 N acts on a 4 kg object. Its acceleration, in meters per second squared, is _____**

ANSWER _____

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24 **Displacement differs from distance because displacement includes**

A only the total path length

B direction

C only the time taken

D only the speed

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25 **A book rests on a table. The normal force on the book is caused by**



A gravity pulling the book down

B the table pushing up on the book

C air pressure on the book

D friction on the book

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ANSWER KEY

1. B
2. A
3. D
4. C
5. 30
6. C
7. B
8. D
9. B
10. A
11. D
12. C
13. A
14. B
15. C
16. A
17. D
18. C
19. B
20. 40
21. 12
22. 6
23. 5
24. B
25. B

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