ALBERTA PHYSICS 20 · UNIT B · 25 QUESTIONS

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 hockey puck slides across a frictionless ice surface at a constant velocity. The net force, F_{net}, acting on the puck is**



A in the direction of motion

B zero

C equal to the weight of the puck

D directed toward the ice surface

Understand It with Pulse

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2 **The weight of a 12 kg mass on Earth, where g = 9.81 m/s², is**

- **A** 118 N
- **B** 12 N
- **C** 1.22 N
- **D** 1.18×10^3 N

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3 **A book rests motionless on a horizontal table. The gravitational force that Earth exerts on the book forms an action-reaction pair with**



A the normal force exerted on the book by the table

B the gravitational force exerted on Earth by the book

C the force exerted on the table by the book

D the force exerted on the book by the table due to friction

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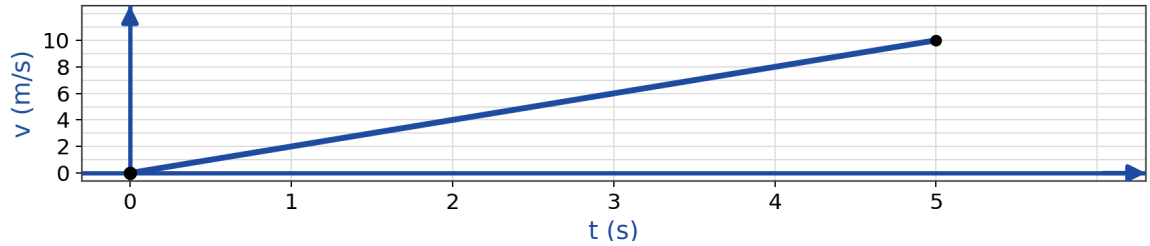
4

The velocity-time graph shows the motion of a 6.0 kg cart. The magnitude of the net force acting on the cart, in newtons, is _____



ANSWER

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5 **A crate slides across a rough horizontal floor. The force of kinetic friction acting on the crate is directed**



A perpendicular to the floor

B in the same direction as the motion

C opposite to the direction of motion

D in the direction of the applied force

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6 **A 15 kg box slides across a horizontal surface. The coefficient of kinetic friction between the box and the surface is 0.25. Use g = 9.81 m/s². The magnitude of the force of kinetic friction acting on the box is**

- A 3.75 N
- B 147 N
- C 589 N
- D 36.8 N

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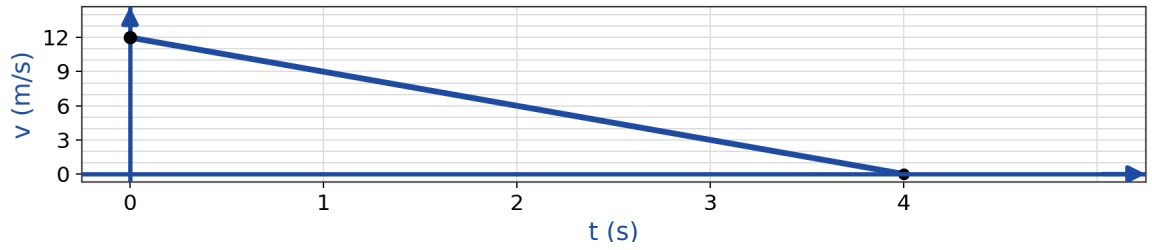
7 **A horizontal force of 150 N pushes a 25 kg crate across a floor. The force of friction opposing the motion is 50 N. The acceleration of the crate is**

- A 4.0 m/s²
- B 2.0 m/s²
- C 6.0 m/s²
- D 8.0 m/s²

Understand It with Pulse | Flag a mistake

8 **The velocity-time graph shows an 8.0 kg box sliding across a floor and slowing under kinetic friction alone. The magnitude of the force of kinetic friction acting on the box is**



A 24 N

B 96 N

C 32 N

D 12 N

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9 **A student pushes against a wall with a horizontal force of 200 N. The force that the wall exerts back on the student is**

- **A** 0 N, because the wall does not move
- **B** 200 N in the same direction as the push
- **C** 200 N in the direction opposite to the push
- **D** 400 N in the direction opposite to the push

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10 **An astronaut has a mass of 80 kg. On a planet where the acceleration due to gravity is 3.7 m/s², the weight of the astronaut is**

- **A** 7.8×10^2 N
- **B** 3.0×10^2 N
- **C** 80 N
- **D** 22 N

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11 **Two blocks, of mass 3.0 kg and 5.0 kg, are connected by a light rope on a frictionless horizontal surface. A horizontal force of 40 N is applied to the 5.0 kg block, pulling both blocks to the right. The tension in the rope is**

- **A** 40 N
- **B** 25 N
- **C** 5.0 N
- **D** 15 N

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12 **A 4.0 kg block rests on a frictionless horizontal table. A light rope attached to the block passes over a pulley at the edge of the table, and a 2.0 kg mass hangs from the other end of the rope. Use g = 9.81 m/s². The acceleration of the system is**

- **A** 3.27 m/s²
- **B** 6.54 m/s²
- **C** 9.81 m/s²
- **D** 1.64 m/s²

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13 **A 6.0 kg block rests on a frictionless horizontal table and is connected by a light rope over a pulley at the edge of the table to a hanging mass of 4.0 kg. Use g = 9.81 m/s². The tension in the rope, in newtons to the nearest tenth, is ____**



ANSWER

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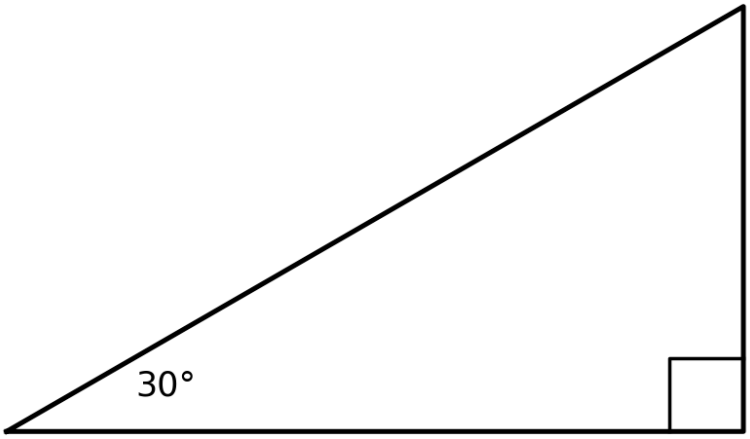
14 **The triangle shows a frictionless ramp. A block slides down the ramp. Use g = 9.81 m/s². The acceleration of the block down the ramp is**



A 8.5 m/s²

B 9.81 m/s²

C 4.9 m/s²

D 2.5 m/s²

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15 **A 10 kg crate slides down a ramp inclined at 25° to the horizontal. The coefficient of kinetic friction between the crate and the ramp is 0.20. Use g = 9.81 m/s². The acceleration of the crate down the ramp is**

- **A** 4.1 m/s²
- **B** 2.4 m/s²
- **C** 5.9 m/s²
- **D** 1.8 m/s²

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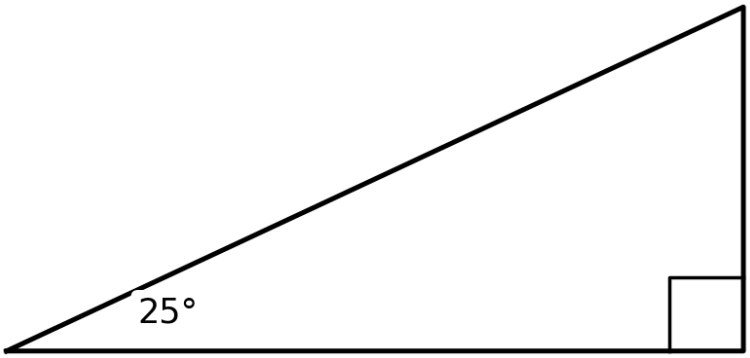
16 **The triangle shows a ramp. A 12 kg block rests on the ramp. Use g = 9.81 m/s². The magnitude of the normal force exerted on the block by the ramp is**



A 118 N

B 59 N

C 107 N

D 98 N

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17 **A box sliding across a horizontal floor comes to rest under the force of kinetic friction alone. The coefficient of kinetic friction is 0.30. Use $g = 9.81\ m/s^2$. The magnitude of the acceleration of the box, in m/s^2 to the nearest hundredth, is ____**

ANSWER _____

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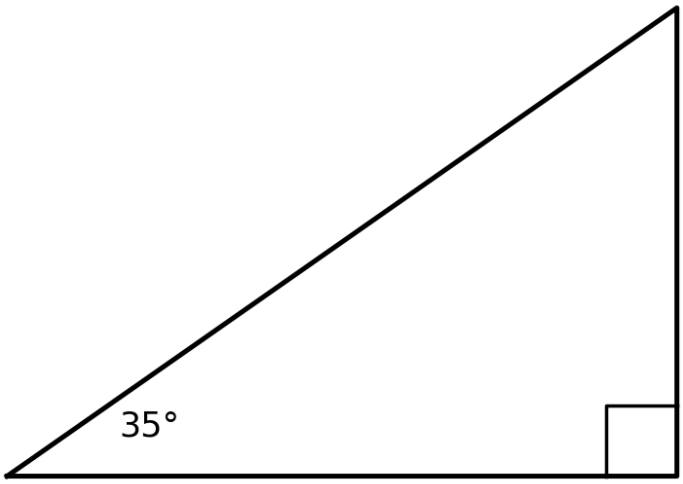
18 **The triangle shows a force of 80 N applied to a box on a frictionless horizontal surface. The horizontal component of the force is**



A 46 N

B 66 N

C 80 N

D 57 N

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19 **On a frictionless horizontal surface, a horizontal force of 48 N is applied to the back of a 6.0 kg block, which pushes against a 2.0 kg block in front of it. Both blocks move together. The force that the 6.0 kg block exerts on the 2.0 kg block is**

- A 48 N
- B 36 N
- C 12 N
- D 6.0 N

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20 **A 8.0 kg crate on a horizontal floor is pulled by a horizontal force of 50 N. The coefficient of kinetic friction between the crate and the floor is 0.25. Use g = 9.81 m/s². The acceleration of the crate, in m/s² to the nearest tenth, is ____**

ANSWER _____

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21 **A person with a mass of 70 kg stands on a scale in an elevator. The elevator accelerates upward at 2.0 m/s². Use g = 9.81 m/s². The reading on the scale, expressed as a force, is**

- **A** 6.9×10^2 N
- **B** 8.3×10^2 N
- **C** 5.5×10^2 N
- **D** 9.7×10^2 N

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22 **A box is pushed across a rough horizontal floor at a constant velocity by a horizontal applied force of 85 N. The magnitude of the force of kinetic friction acting on the box is**

- **A** 0 N
- **B** less than 85 N
- **C** greater than 85 N
- **D** 85 N

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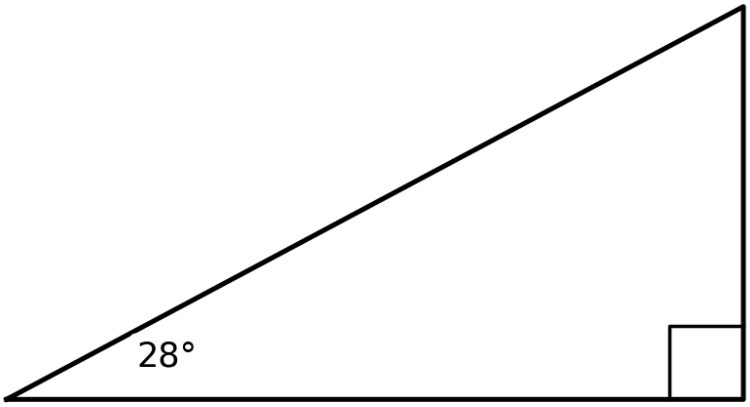
23 **The triangle shows a ramp. A 9.0 kg crate slides down the ramp. The coefficient of kinetic friction between the crate and the ramp is 0.25. Use g = 9.81 m/s². The acceleration of the crate down the ramp, in m/s² to the nearest tenth, is ____**



ANSWER

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24 **Two forces act on a 5.0 kg object at rest on a frictionless surface: a force of 30 N directed east and a force of 40 N directed north. The magnitude of the acceleration of the object is**

- **A** 10 m/s²
- **B** 14 m/s²
- **C** 2.0 m/s²
- **D** 70 m/s²

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25 **A 4.0 kg block rests on a frictionless ramp inclined at 30° to the horizontal. A light rope attached to the block runs up the ramp and over a pulley at the top, and a 6.0 kg mass hangs from the other end. Use g = 9.81 m/s². The magnitude of the acceleration of the system, in m/s² to the nearest hundredth, is ____**

ANSWER _____

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ANSWER KEY

1. B
2. A
3. B
4. 12
5. C
6. D
7. A
8. A
9. C
10. B
11. D
12. A
13. 23.5
14. C
15. B
16. C
17. 2.94
18. B
19. C
20. 3.8
21. B
22. D
23. 2.4
24. A
25. 3.92

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