ALBERTA PHYSICS 20 · UNIT C · 25 QUESTIONS

Circular Motion, Work & Energy — Practice Test

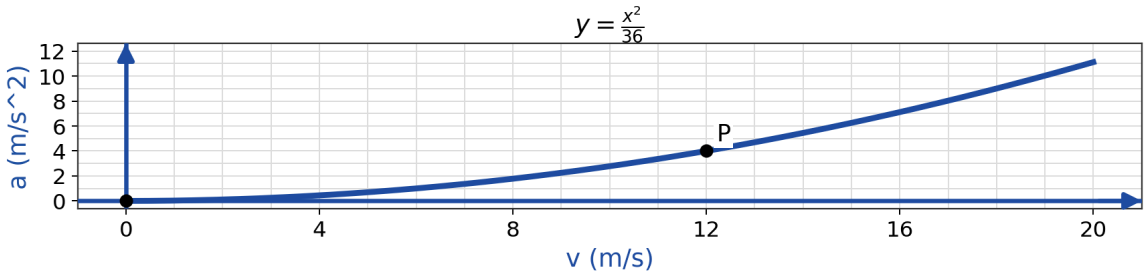
This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **A stone is whirled in a horizontal circle at the end of a string. The centripetal force that keeps the stone moving in the circle is provided by**

- A the force of gravity
- B the tension in the string
- C the normal force
- D air resistance

Understand It with Pulse | Flag a mistake

2 **The graph shows centripetal acceleration against speed for a car on a flat curve. The centripetal acceleration of the car when its speed is 12 m/s, in m/s² to the nearest tenth, is _____**



ANSWER

Understand It with Pulse | Flag a mistake

3 **A worker pushes a crate across a floor with a constant horizontal force of 120 N. The crate moves 6.0 m in the direction of the force. The work done by the worker is**



A 720 J

B 20 J

C 126 J

D 7400 J

Understand It with Pulse | Flag a mistake

4 **The kinetic energy of a 3.0 kg object moving at 4.0 m/s is**

- A 6.0 J
- B 12 J
- C 24 J
- D 48 J

Understand It with Pulse | Flag a mistake

5 **A 2.5 kg box is lifted 1.6 m at a constant speed. The gain in gravitational potential energy of the box is**

- A 4.0 J
- B 16 J
- C 25 J
- D 39 J

Understand It with Pulse | Flag a mistake

6 **A spinner wheel moving in a circle completes 20 revolutions in 8.0 s. The frequency of the motion is**



A 2.5 Hz

B 0.40 Hz

C 12 Hz

D 160 Hz

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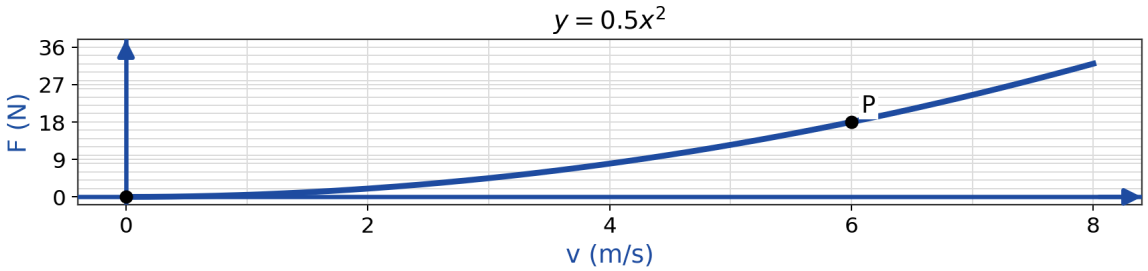
7 **The graph shows centripetal force against speed for a ball on a string moving in a horizontal circle. The magnitude of the centripetal force acting on the ball when its speed is 6.0 m/s is**



A 12 N

B 18 N

C 24 N

D 36 N

Understand It with Pulse | Flag a mistake

8 **A motor does 2.4×10^3 J of work in 8.0 s. The power output of the motor, in watts, is _____**

ANSWER _____

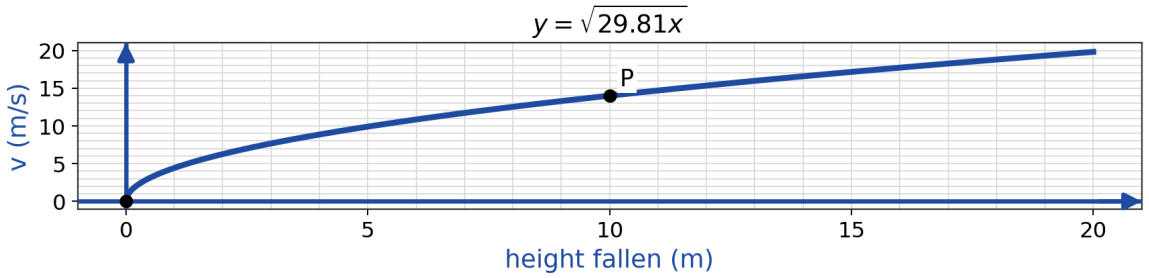
Understand It with Pulse | Flag a mistake

9 **A spring with a spring constant of 250 N/m is stretched 0.12 m from its equilibrium position. The magnitude of the force exerted by the spring is**

- **A** 3.0 N
- **B** 30 N
- **C** 300 N
- **D** 2.1×10^3 N

Understand It with Pulse | Flag a mistake

10 **The graph shows the speed of a roller coaster car against the height it has fallen, starting from rest and ignoring friction. The speed of the car after falling 10 m, in m/s to the nearest tenth, is ____**



ANSWER _____

Understand It with Pulse | Flag a mistake

11 **Two objects attract each other with a gravitational force of magnitude F. If the distance between their centres is doubled, the magnitude of the force becomes**

- **A** one-quarter as great
- **B** one-half as great
- **C** two times as great
- **D** four times as great

Understand It with Pulse | Flag a mistake

12 **Two spherical objects, each with a mass of 100 kg, have their centres 2.0 m apart. Use $G = 6.67 \times 10^{-11}$ N · m²/kg². The magnitude of the gravitational force between them, expressed in the form $a.bc \times 10^{-7}$ N, has a.bc = ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

13 **A planet has a mass of 4.0×10^{23} kg and a radius of 3.0×10^{6} m. Use $G = 6.67 \times 10^{-11}$ N · m²/kg². The gravitational field strength at the surface of the planet is**



A 0.33 m/s²

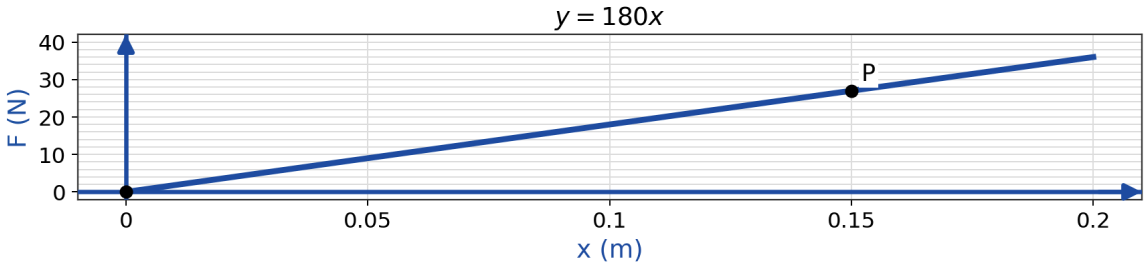
B 8.9 m/s²

C 3.0 m/s²

D 27 m/s²

Understand It with Pulse | Flag a mistake

14 **The graph shows spring force against compression for a spring. The elastic potential energy stored in the spring when it is compressed by 0.15 m, in joules and to the nearest hundredth, is _____**



ANSWER

Understand It with Pulse | Flag a mistake

15 **A net force does 45 J of work on a 5.0 kg object that is initially at rest. The final speed of the object is**

A 3.0 m/s

B 4.2 m/s

C 9.0 m/s

D 18 m/s

Understand It with Pulse | Flag a mistake

16 **A satellite moves in a circular orbit around Earth, with Earth's gravity providing the centripetal force. If the radius of the orbit is increased to four times its original value, the orbital speed of the satellite will be**



A four times as great

B two times as great

C unchanged

D one-half as great

Understand It with Pulse | Flag a mistake

17 **A point on the rim of a rotating disk, 0.60 m from the centre, moves in a circle with a period of 1.5 s. The magnitude of the centripetal acceleration of the point, in m/s² and to the nearest tenth, is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

18 **A crane lifts a 500 kg load 12 m at a constant speed in 30 s. The power output of the crane is approximately**

A 2.0×10^3 W

B 2.0×10^2 W

C 5.9×10^3 W

D 5.9×10^4 W

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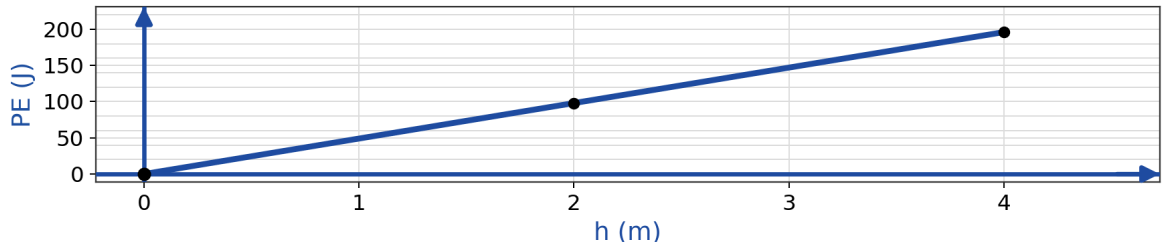
19 **A spring with a spring constant of 400 N/m is compressed 0.10 m and used to launch a 0.050 kg ball straight upward. Ignoring air resistance, the maximum height reached by the ball, in metres and to the nearest tenth, is ____**



ANSWER

Understand It with Pulse | Flag a mistake

20 **The graph shows gravitational potential energy against height for an object. The gravitational potential energy of the object at a height of 3.0 m is**



A 98 J

B 147 J

C 196 J

D 294 J

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21 **The gravitational field strength at Earth's surface is 9.81 N/kg. A satellite is located at a distance of 2.0 Earth radii from Earth's centre. The gravitational field strength at the location of the satellite is**

- **A** 4.9 N/kg
- **B** 2.5 N/kg
- **C** 9.8 N/kg
- **D** 39 N/kg

Understand It with Pulse | Flag a mistake

22 **A satellite orbits Earth in a circular orbit with a radius of 7.0×10^{6} m. Use $G = 6.67 \times 10^{-11}$ N · m²/kg² and a mass for Earth of 5.97×10^{24} kg. The orbital speed of the satellite is**

- **A** 5.7 km/s
- **B** 57 km/s
- **C** 11 km/s
- **D** 7.5 km/s

Understand It with Pulse | Flag a mistake

23 **A spring is compressed to store elastic potential energy. If the compression of the spring is doubled, the elastic potential energy stored in the spring will be**



A four times as great

B two times as great

C eight times as great

D unchanged

Understand It with Pulse | Flag a mistake

24 **A block slides 3.5 m across a floor and comes to rest. The kinetic friction force acting on the block is 12 N. The work done by friction on the block is**

A 42 J

B -3.4 J

C -42 J

D 0 J

Understand It with Pulse | Flag a mistake

25 **A 0.20 kg ball is thrown straight upward with an initial speed of 12 m/s. Ignoring air resistance, the maximum height reached by the ball, in metres and to the nearest tenth, is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

ANSWER KEY

1. B
2. 4
3. A
4. C
5. D
6. A
7. B
8. 300
9. B
10. 14
11. A
12. 1.67
13. C
14. 2.03
15. B
16. D
17. 10.5
18. A
19. 4.1
20. B
21. B
22. D
23. A
24. C
25. 7.3

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