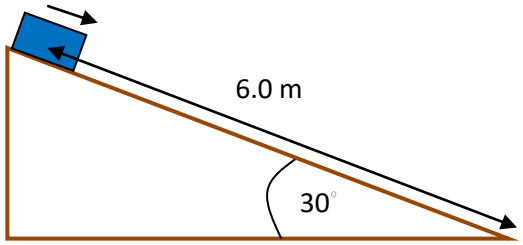
Quiz A3

Work, energy and power

1. A body of mass 5.0 kg slides down the full length of an inclined plane without friction. The incline makes an angle 30° to the horizontal and has length 6.0 m.



What is the work done by the weight of the body?

A 150 J **B** 300 J **C** –150 J **D** –300 J

2. A body of mass 8.0 kg has initial kinetic energy 640 J and is brought to rest by a frictional force over a distance 16 m. What is the frictional force?

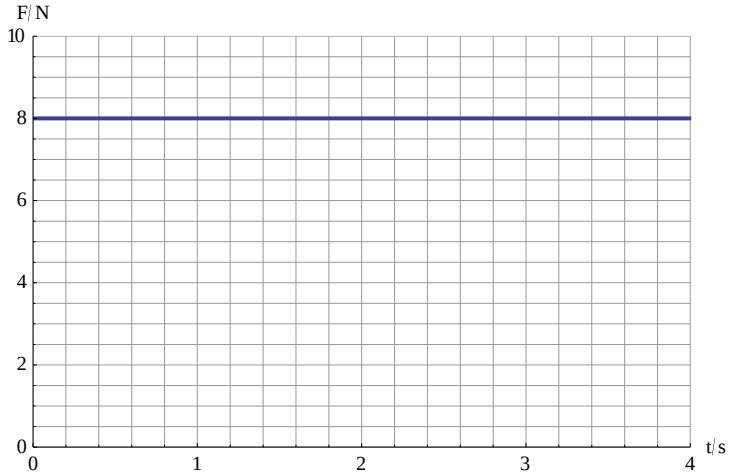
A 2.0 N **B** 40 N **C** 80 N **D** 128 N

3. The graph shows how the net force on a body of mass 4.0 kg varies with distance travelled.

The initial velocity of the body is zero. What is the velocity of the body after travelling 4.0 m?

A 0 **B** $4.0\,\text{m s}^{-1}$ **C** $4\sqrt{2}\,\text{m s}^{-1}$ **D** $8\sqrt{2}\,\text{m s}^{-1}$

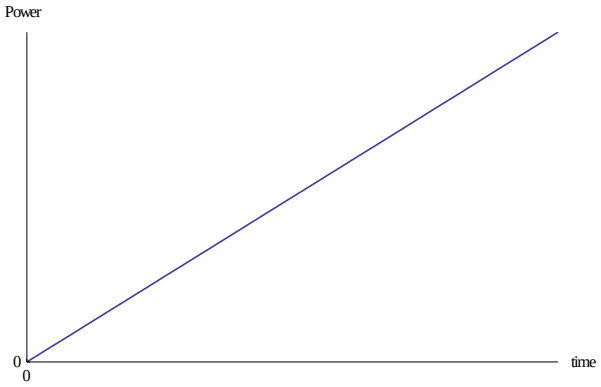
4. The graph shows how the net force on a body of mass 2.0 kg varies with time. The body is initially at rest.



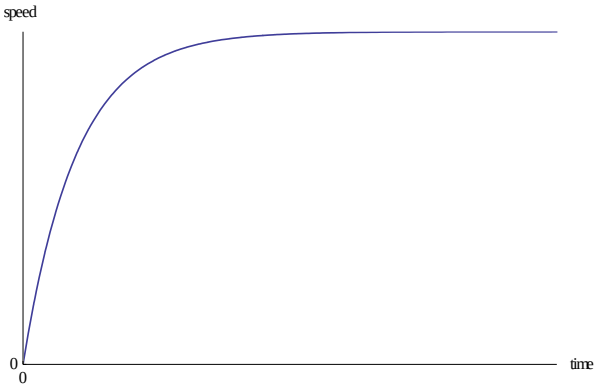
What is the **maximum** power delivered to the body during the 4 second interval?

A 32 W **B** 64 W **C** 128 W **D** 256 W

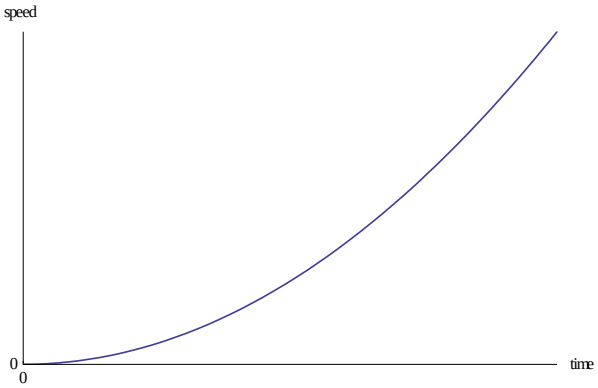
5. The power delivered to a body initially at rest varies with time as shown.



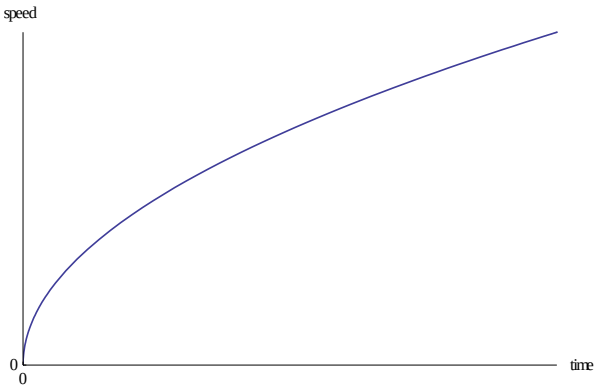
Which graph shows the correct variation with time of the speed of the body?



A



B



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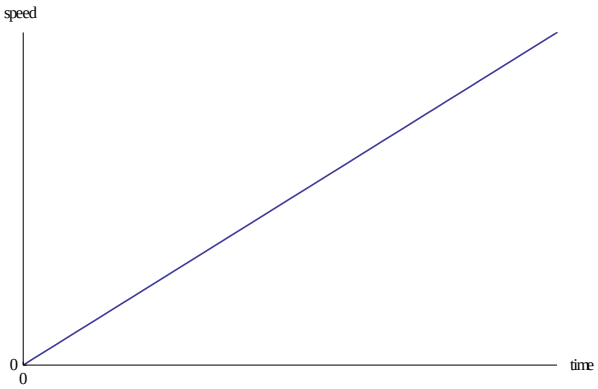
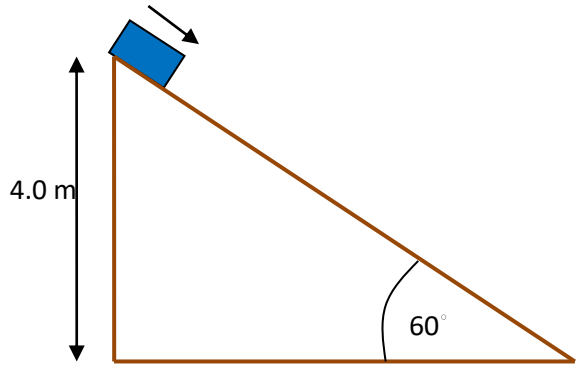


D

6. A body of mass 5.0 kg slides from rest down a rough inclined plane. The incline makes an angle 60° to the horizontal and has height 4.0 m.

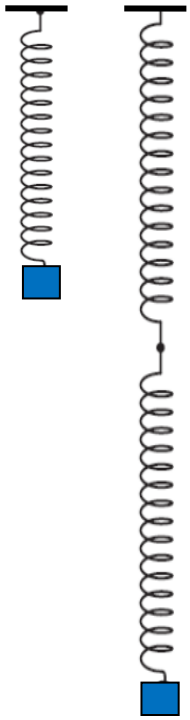


The speed of the body at the bottom of the incline is $8.0\ \text{m s}^{-1}$.

What is the magnitude of the work done by friction?

A 40 J **B** 160 J **C** 200 J **D** 360 J

7. A block of mass 2.0 kg hangs vertically at the end of a spring of negligible mass. The potential energy stored in the spring is 12 J. A second identical spring is attached to the first spring and the same block is attached to the lower spring.



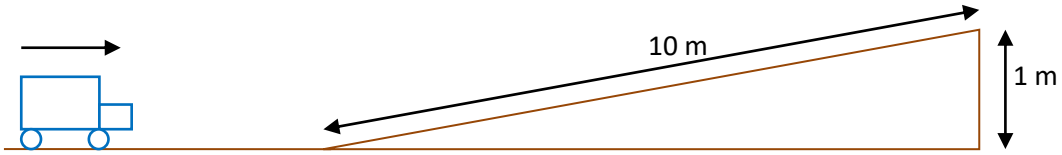
What is the total energy stored in the two springs?

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

8. A body of mass 15 kg is raised vertically. The gravitational potential energy of the body is increasing at a rate 300 W. How long will it take to raise the body by a distance of 20 m?

A 0.10 s **B** 1.0 s **C** 10 s **D** 100 s

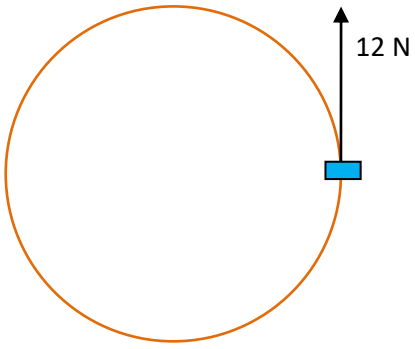
9. A truck of mass 2000 kg is driven on a horizontal road with constant speed 8.0 m s^{-1}. The truck then enters an inclined road. For every 10 m travelled the height increases by 1 m.



What **additional** power must the engine develop in order for the truck to continue moving at the same speed?

A 0 **B** 1.6 kW **C** 16 kW **D** 160 kW

10. A bead is attached to a horizontal ring of radius 2.0 m. A force of 12 N acts on the bead. The force is always tangent to the ring.



What can be said about the work done by this force in one full revolution?

A It is zero because the displacement is zero.
B It cannot be calculated because the path is not straight.
C It cannot be calculated because the force keeps changing direction.
D The work done is 48π J.

Quiz A3 Answers	
1	A
2	B
3	B
4	C
5	D
6	A
7	C
8	C
9	C
10	D