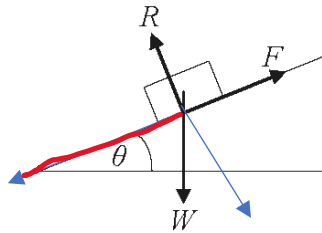


Which of the following is the condition for a body to be in translational equilibrium?

- A. The resultant force on the body in any direction is zero.
- B. The velocity of the body in any direction is zero.
- C. No external force is acting on the body.
- D. No work is done on the body.

A block of weight W slides down an inclined plane at a constant speed.



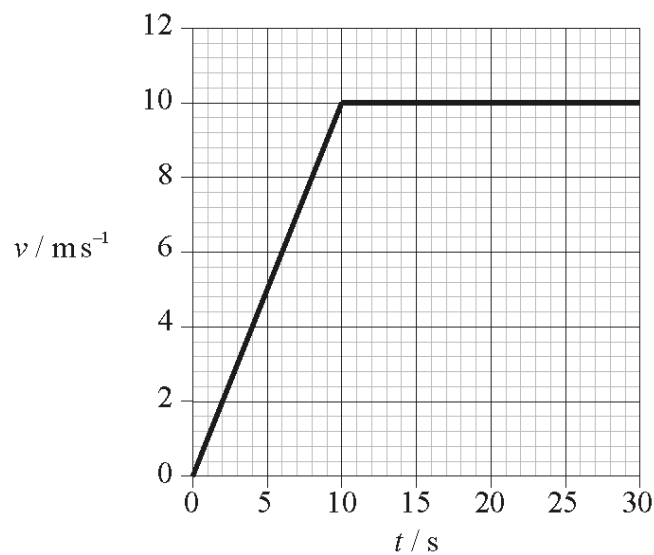
The normal reaction acting between the block and the plane is R and the frictional force between the block and the plane is F . The incline is at an angle θ to the horizontal. What is the magnitude of F ?

- A. $R \cos \theta$
- B. $R \sin \theta$
- C. $W \cos \theta$
- D. $W \sin \theta$

A body is moving in a straight line. A force F acts on the body in the direction of the body's motion. A resistive force f acts on the body. Both forces act along the same straight line as the motion of the body. The rate of change of momentum of the body is equal to

- A. $F - f$.
- B. F .
- C. $F + f$.
- D. f .

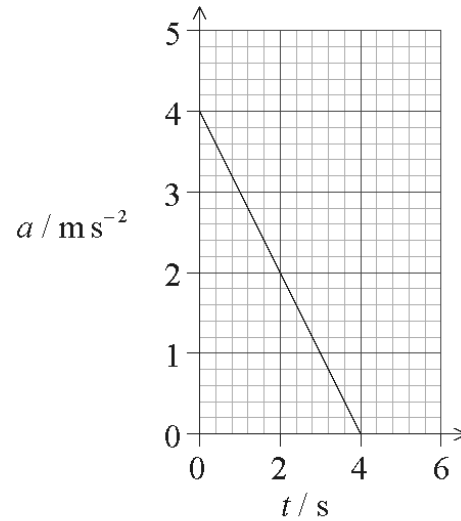
Joseph runs along a long straight track. The variation of his speed v with time t is shown below.



After 25 seconds Joseph has run 200 m. Which of the following is correct at 25 seconds?

	Instantaneous speed / m s^{-1}	Average speed / m s^{-1}
A.	8 m s^{-1}	8 m s^{-1}
B.	8 m s^{-1}	10 m s^{-1}
C.	10 m s^{-1}	8 m s^{-1}
D.	10 m s^{-1}	10 m s^{-1}

The graph shows the variation with time t of the acceleration a of an object.



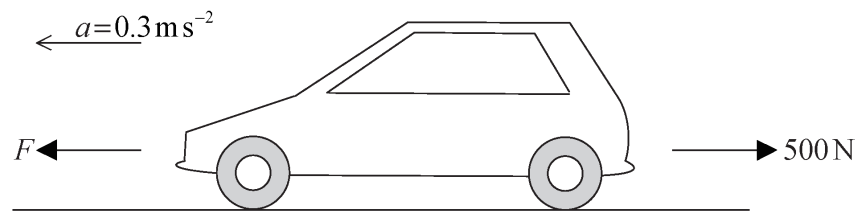
Which of the following is the change in velocity of the object in the time interval 0 to 4s?

- A. -8 m s^{-1}
- B. -4 m s^{-1}
- C. $+4 \text{ m s}^{-1}$
- D. $+8 \text{ m s}^{-1}$

A small object is attached to a string and rotated in a circle of constant radius in a horizontal plane. The tension T in the string is measured for different speeds v . Which of the following plots should give a straight-line graph?

- A. T against v
- B. T^2 against v
- C. T against v^2
- D. T^2 against v^2

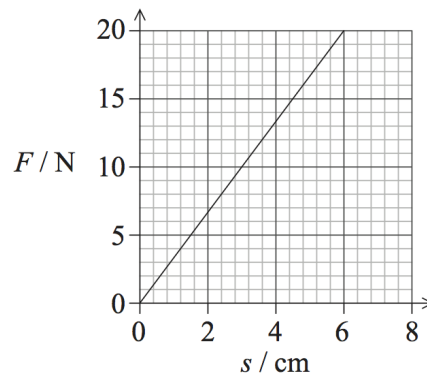
A car of mass 1000 kg accelerates on a straight, flat, horizontal road with an acceleration $a=0.3\text{ m s}^{-2}$. The driving force F on the car is opposed by a resistive force of 500 N .



The net (resultant) force on the car is

- A. 200 N .
- B. 300 N .**
- C. 500 N .
- D. 800 N .

The graph shows the variation with force F of the extension s of a spring.

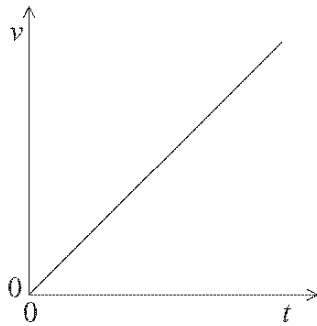


The work done in changing the extension of the spring from 3.0 cm to 6.0 cm is

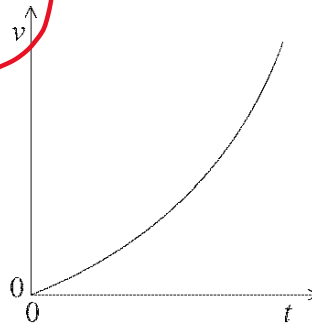
- A. 15 N cm .
- B. 30 N cm .
- C. 45 N cm .**
- D. 60 N cm .

A car accelerates from rest. The acceleration increases with time. Which graph shows the variation with time t of the speed v of the car?

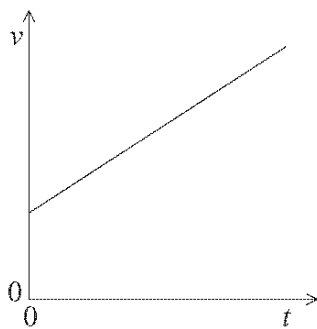
A.



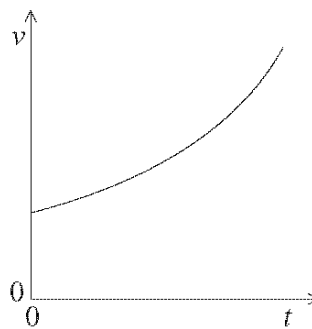
B.



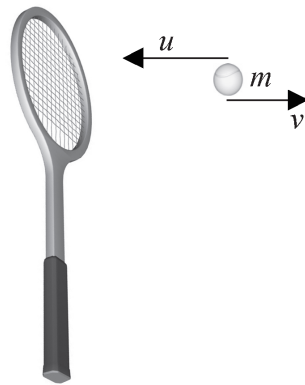
C.



D.



A tennis ball of mass m moving horizontally with speed u strikes a vertical tennis racket. The ball bounces back with a horizontal speed v .



The magnitude of the change in momentum of the ball is

A. $m(u+v)$.

B. $m(u-v)$.

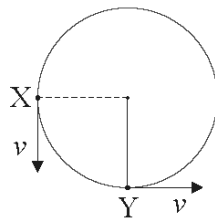
C. $m(v-u)$.

D. zero.

A brother and sister take the same time to run up a set of steps. The sister has a greater mass than her brother. Which of the following is correct?

	Has done the most work	Has developed the greatest power
A.	brother	brother
B.	brother	sister
C.	sister	brother
D.	sister	sister

A stone attached to a string is moving in a horizontal circle. The constant speed of the stone is v . The diagram below shows the stone in two different positions, X and Y.



Which of the following shows the direction of the change of velocity of the stone when moving from position X to position Y?

A.

B.

C.

D.

A nuclear power station produces 10 GW of electrical power. The power generated by the nuclear reactions in the core of the reactor is 25 GW. The efficiency of the power station is

- A. 15%.
- B. 35%.
- C. 40%.
- D. 60%.

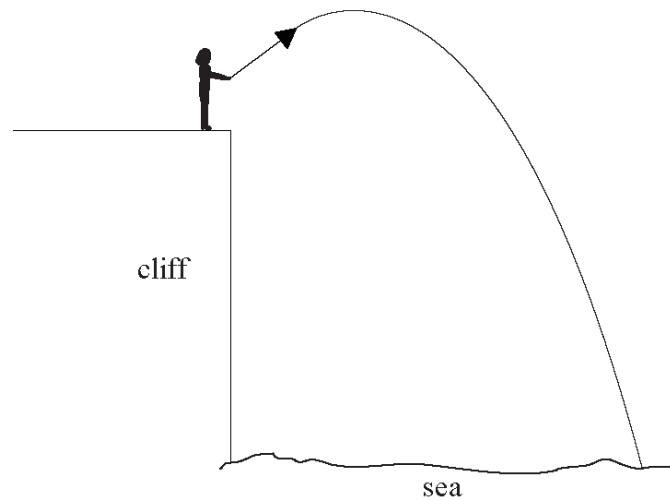
A cyclist rides around a circular track at a uniform speed. Which of the following correctly gives the net horizontal force on the cyclist at any given instant of time?

	Net horizontal force along direction of motion	Net horizontal force normal to direction of motion
A.	zero	zero
B.	zero	non zero
C.	non zero	zero
D.	non zero	non zero

A solid piece of tungsten melts into liquid without a change in temperature. Which of the following is correct for the molecules in the liquid phase compared with the molecules in the solid phase?

	Kinetic energy	Potential energy
A.	same	greater
B.	same	same
C.	greater	greater
D.	greater	same

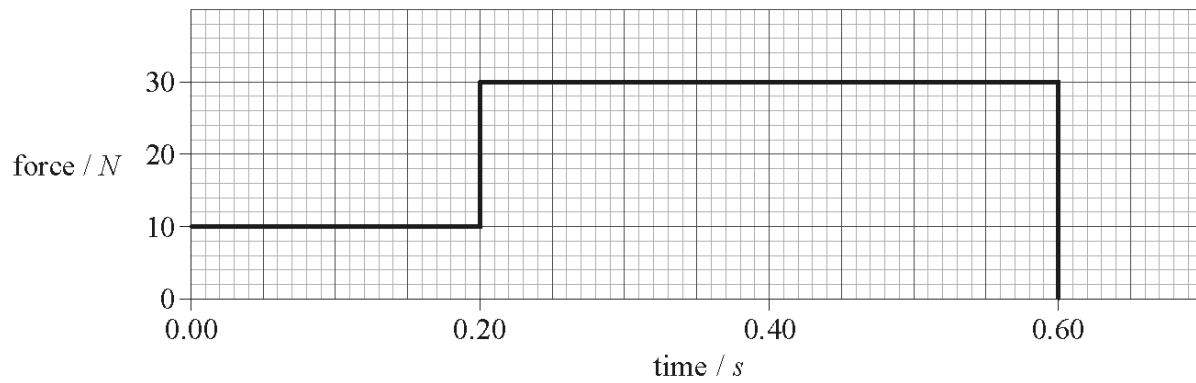
A stone is thrown from a cliff and it lands in the sea as shown below. Air resistance is negligible.



Which of the following statements is correct whilst the stone is in motion?

- A. The vertical component of the stone's displacement is constant.
- B. The horizontal component of the stone's displacement is constant.
- C. The vertical component of the stone's velocity is constant.
- D. The horizontal component of the stone's velocity is constant.

The graph shows how an external force applied to an object of mass 2.0 kg varies with time. The object is initially at rest.



What is the speed of the object after 0.60 s ?

- A. 7.0 m s^{-1}
- B. 14 m s^{-1}
- C. 18 m s^{-1}
- D. 28 m s^{-1}