

Acceleration

Name & Set

Write down in words the equation that links acceleration, change in velocity and time taken.

Write down the same formula in symbols, giving the meaning of each symbol on the right

Equation	Meaning of symbol

- 1 A car can accelerate to a speed of 30 m/s^1 from rest in 6 seconds. What is its average acceleration?

[2]

- 2 A car starts from rest and moves forward with a constant acceleration of 2 m/s^2 for 10 seconds. What velocity does it reach at the end of this time?

[2]

- 3 A car starts from rest and accelerates at 3 ms^{-2} . How long will it take to reach a velocity of 30 m/s ?

[2]

- 4 A rocket is launched vertically. Starting from rest, it accelerates at 30 m/s^2 for 5 seconds. What speed does it reach at the end of this time?

[2]

- 5 A bicycle is moving with a speed of 10 m/s^1 . How long will it take to come to rest if the brakes cause it to slow down at a rate of 2.5 m/s^2 ?

[2]

YEAR 10 PHYSICS

- 6 An advertisement for a particular car claims that it can reach a velocity of 27 m/s from a standing start in 7.2 seconds. Calculate the acceleration of the car.

[2]

- 7 Two cars A and B are travelling side by side at 20 m/s. For car B to overtake car A it must accelerate. B's velocity increases from 20 m/s to 32 m/s in 4 seconds. Car A continues to travel at 20 m/s.

(a) How far does car A travel in 4 seconds?

[2]

(b) Calculate the acceleration of car B

[2]

- 8 A ball is dropped from rest from a top floor window. It takes 2.5 seconds to hit the ground. It accelerates towards the ground at 10 m/s^2 . With what speed does it hit the ground?

[2]

- 9 A stone is thrown vertically upwards. It takes 2 seconds to reach its highest point. The acceleration due to gravity is 10 m/s^2 .

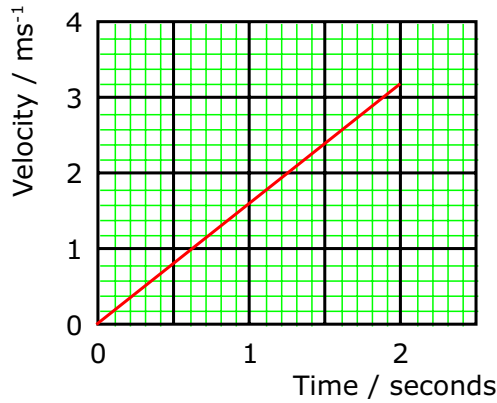
(a) What is the stone's velocity when it reaches its highest point? Explain your answer.

[2]

(b) With what velocity must it be thrown into the air?

[2]

10 An astronaut on the Moon's surface drops a stone from rest. The velocity time graph shows the motion of the falling stone.



(i) How long does it take the stone to fall to the ground? _____ [1]

(ii) How fast is the stone moving when it hits the Moon's surface? _____ [1]

(iii) Calculate a value for the acceleration due to gravity on the Moon from the graph.

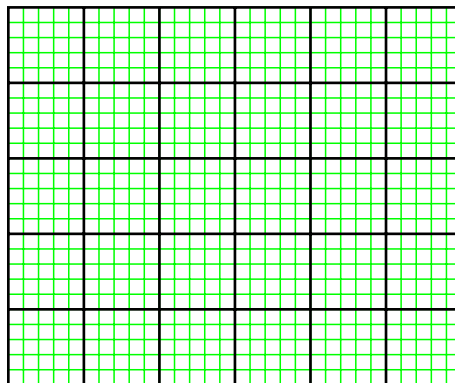
_____ [2]

(iv) How far does the stone fall?

_____ [2]

11 An aeroplane must reach a velocity of 100 m/s before it can take off. Starting from rest it accelerates down the runway at a uniform rate. It takes 25 seconds to become airborne.

(a) Use this information to plot a velocity time graph for the aeroplane during take-off.



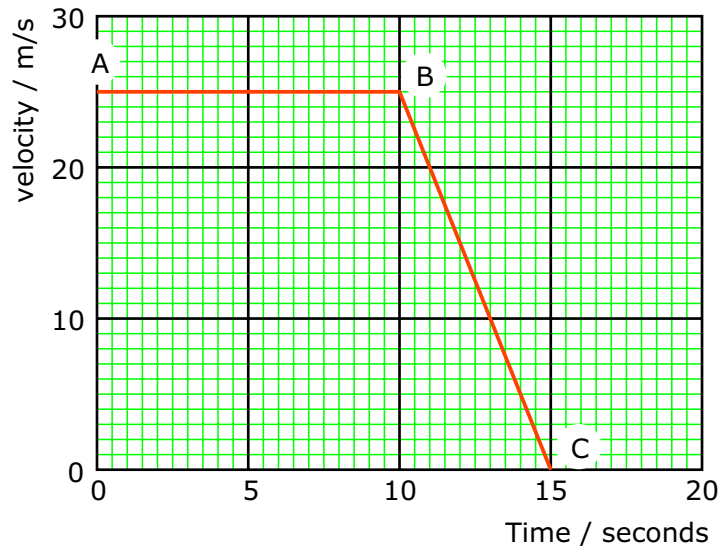
(b) What is the acceleration of the plane?

_____ [2]

(c) How far does the plane travelled along the runway before it gets airborne?

_____ [2]

12 The velocity-time graph below represents the journey of a car.



(a) Describe its motion between

(i) A & B _____ [1]

(ii) B & C _____ [1]

(b) How far does the car travel between A & B?

 _____ [2]

(c) How far does the car travel between B & C?

 _____ [2]

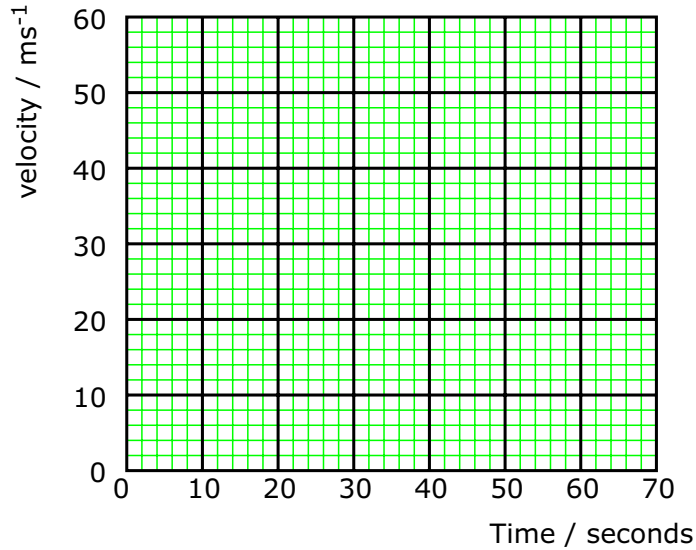
(d) What is the total distance travelled by the car between A & C?

 _____ [2]

13 A car accelerates from rest to 48 m/s in 12 seconds. It then travels at this velocity for 40 seconds after which it slows to rest in 8 seconds.

(a) What is the total journey time? _____ [2]

(b) Draw a velocity-time graph for the car's journey using the grid below. [4]



(b) Calculate its acceleration in the first 12 seconds.

 _____ [2]

(c) Calculate the acceleration in the final 8 seconds.

 _____ [2]

(d) Use the graph to find out how far the car travels in 60 seconds.

 _____ [2]