

Velocity Time Graphs

Mark Scheme

Level	GCSE
Subject	Maths
Exam Board	Edexcel GCSE
Topic	Velocity Time Graphs
Grade Level	Grade 8/9
Booklet	Mark Scheme

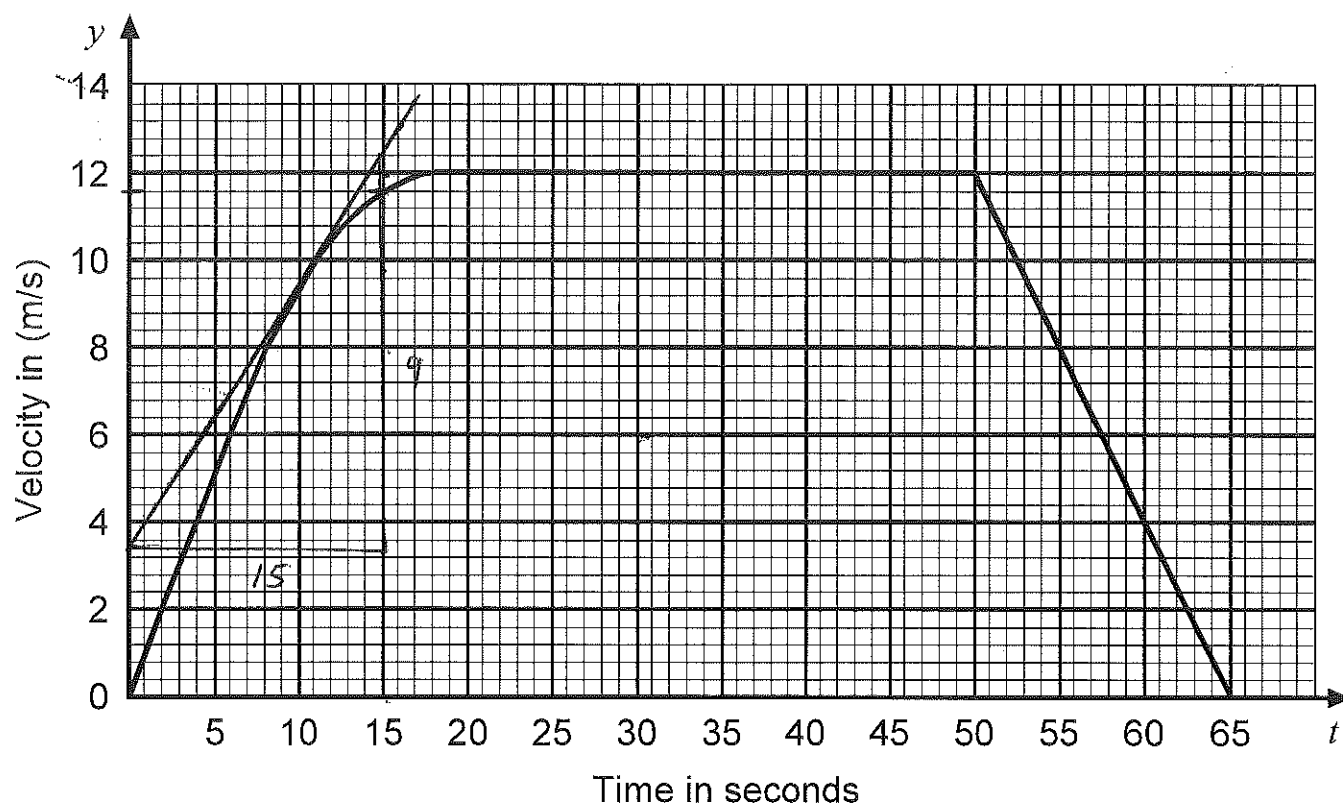
Time Allowed: 36 minutes

Score: /30

Percentage: /100

Grade Boundaries:

1. A car travels between two sets of traffic lights.
The diagram represents the velocity/time graph of the car.



The car leaves the first set of traffic lights.

- (a) Use the graph to find the velocity of the car after 15 seconds.

..... 11.6 m/s (1)

- (b) Calculate an estimate for the acceleration of the car, in m/s^2 , after 10 seconds.

$$\frac{9}{15} = \frac{3}{5} = 0.6 \text{ m/s}^2$$

..... (2)

2. A toy car is placed on the floor of a sports hall.

It moves in a straight line starting from rest.

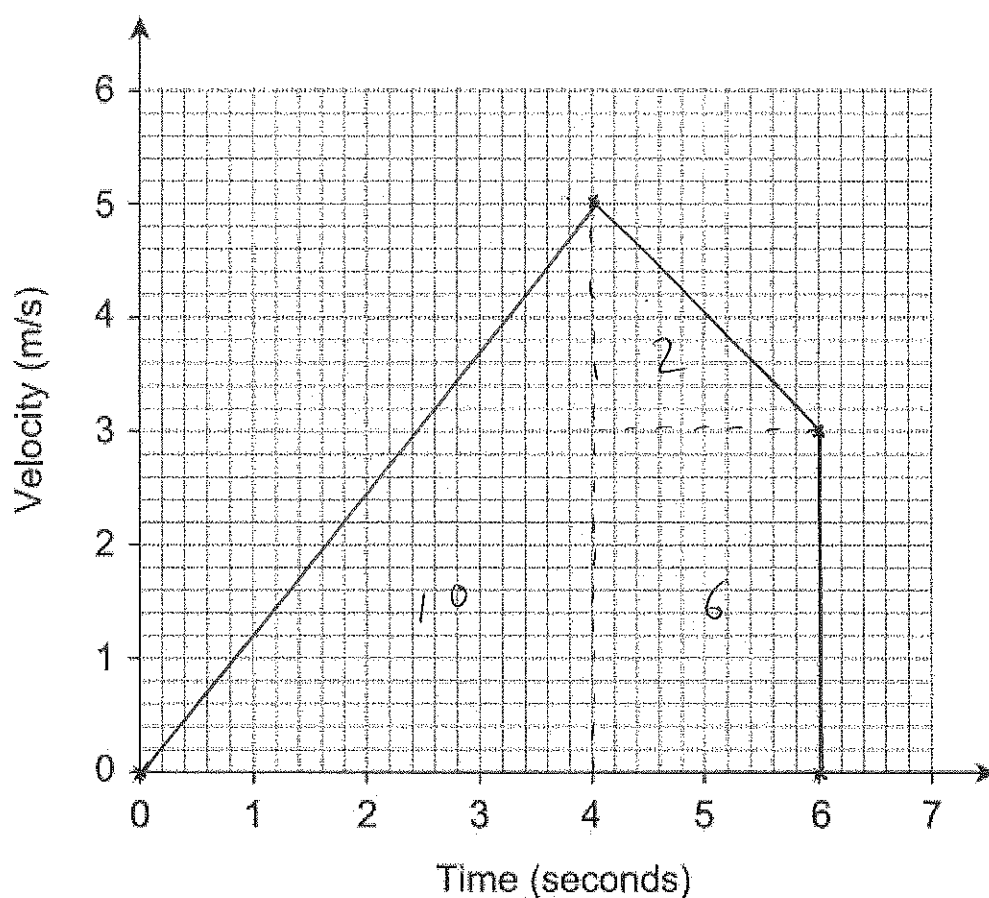
It travels with constant acceleration for 4 seconds reaching a velocity of 5m/s.

It then slows down with constant deceleration of 1m/s^2 for 2 seconds.

It then hits a wall and stops.

- a) Draw a velocity-time graph for the toy car.

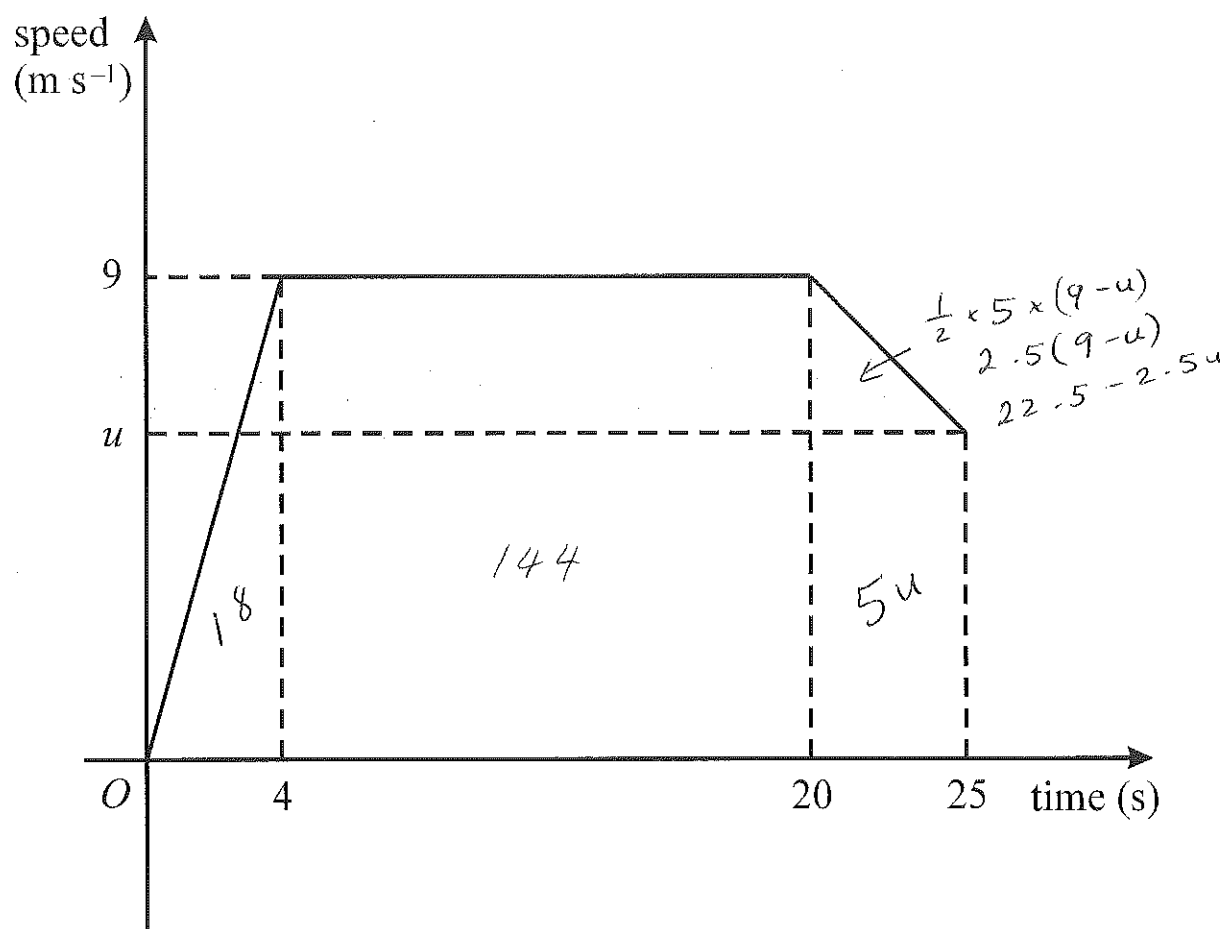
(3)



- b) Work out the total distance travelled by the toy car.

.....m (3)

3. A sprinter runs a race of 200 m.
 Her total time for running the race is 25 s.
 Below is a sketch of the speed-time graph for the motion of the sprinter.



Calculate:

- a) The acceleration in the first 4 seconds of the race

$$\frac{9}{4}$$

$$2.25 \text{ m/s}^2 \quad (2)$$

- b) The distance covered by the sprinter in the first 20 seconds of the race

$$162 \text{ m} \quad (2)$$

- c) The value of u

$$22.5 - 2.5u + 5u = 38$$

$$2.5u + 22.5 = 38$$

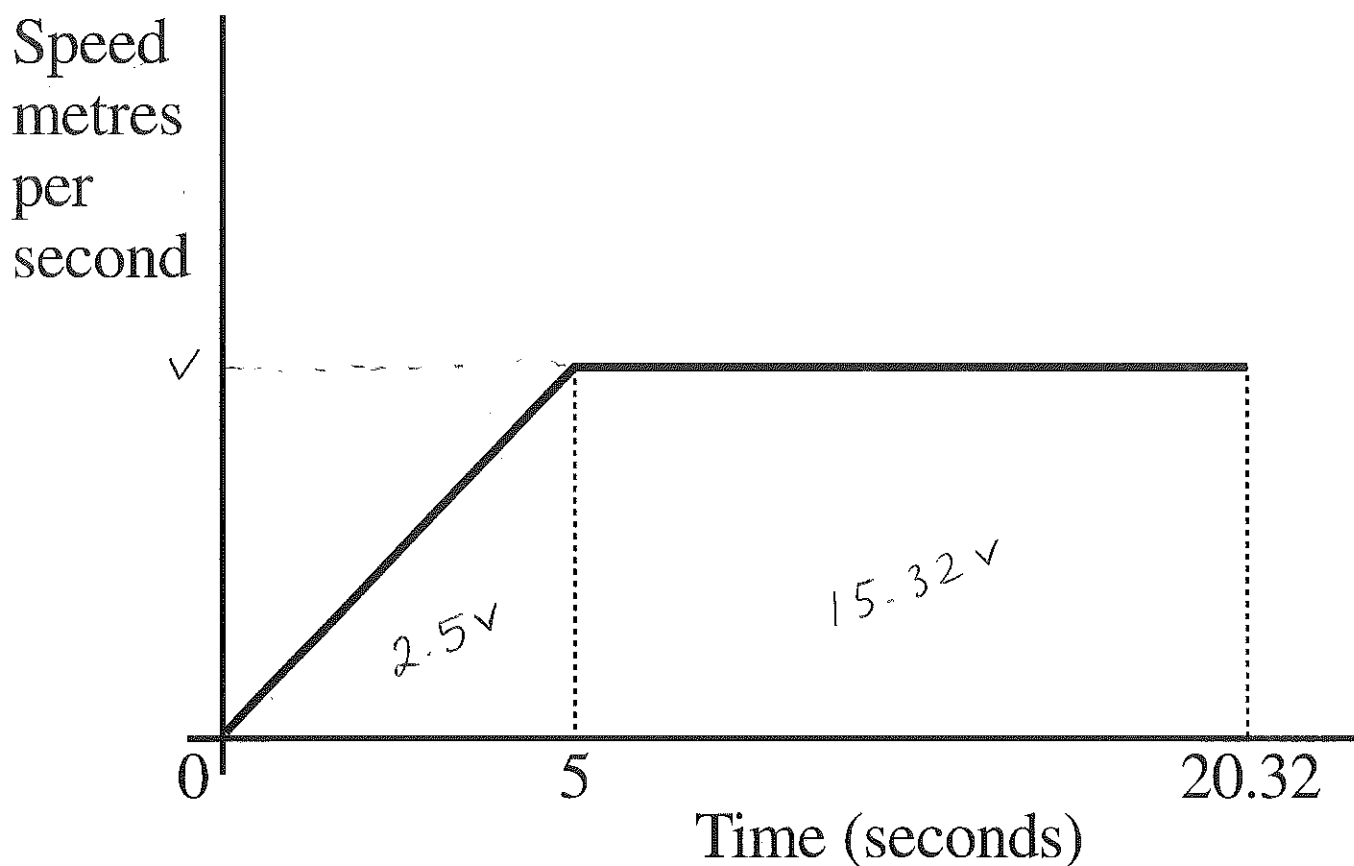
$$2.5u = 15.5$$

$$u = \frac{15.5}{2.5}$$

$$= 6.2$$

$$6.2 \text{ m/s} \quad (3)$$

5. A sprinter runs a race of 200 m.
 His total time for running the race is 20.32s.
 Below is a sketch of the speed-time graph for the motion of the sprinter.



Calculate:

- a) The maximum speed of the sprinter during the race

$$17.82v = 200$$

$$v = \frac{200}{17.82}$$

$$v = 11.22 \text{ m/s (2dp)}$$

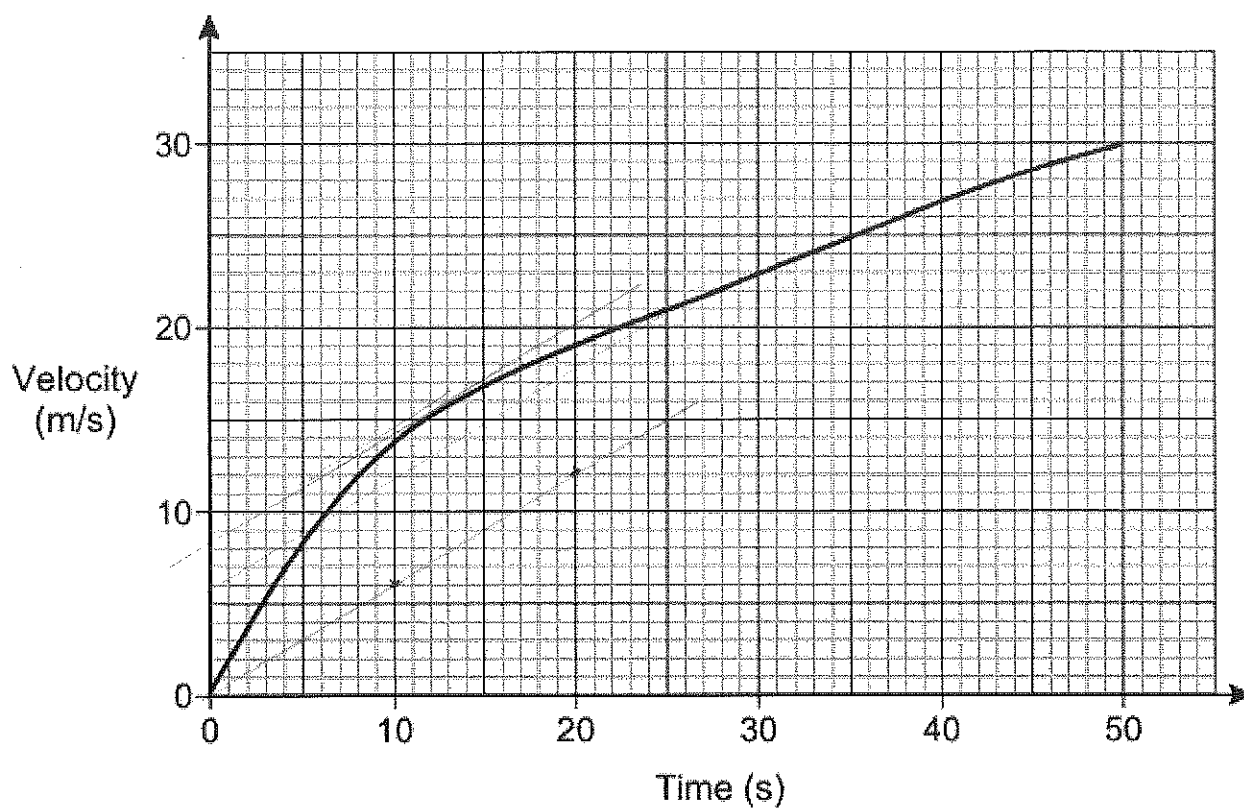
..... (4)

- b) The distance covered by the sprinter in the first 5 seconds of the race

$$2.5 \times 11.22$$

$$28.06 \text{ m (2)} \\ \text{(2dp)}$$

6. Here is the velocity-time graph of a car for 50 seconds.



Work out the average acceleration during the 50 seconds.
Give the units of your answer.

$$\frac{30}{50} = 0.6 \text{ m/s}^2$$

..... (2)

Estimate the time during the 50 seconds when
the instantaneous acceleration = the average acceleration
You must show your working on the graph.

..... 12 s..... (2)