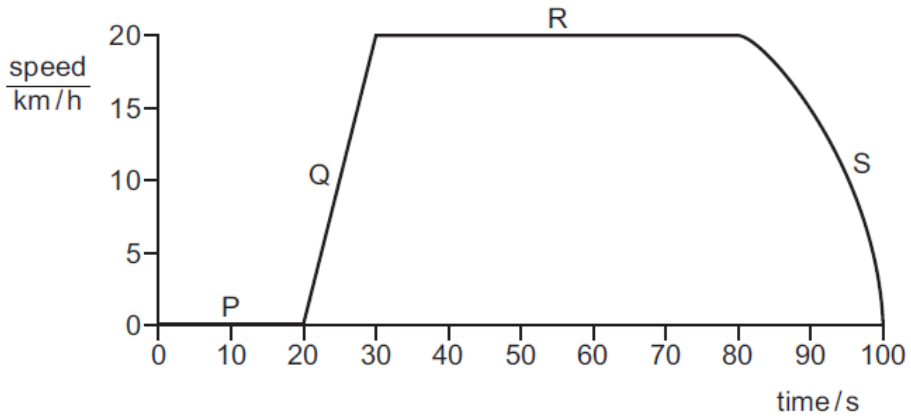
Motion – 2022 June IGCSE 0625

1. June/2022/Paper_11/No.2

The speed–time graph for a train is shown.



Which regions of the graph show the train moving?

A P, Q, R and S

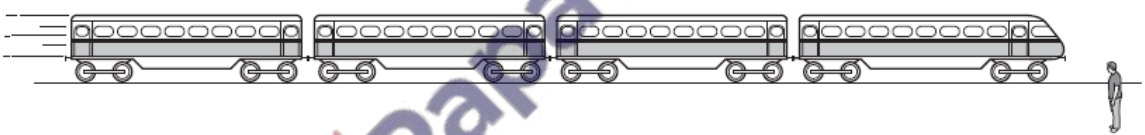
B Q, R and S only

C Q and S only

D R only

2. June/2022/Paper_11/No.3

A man stands next to a railway track.



A train travelling at 40 m/s takes 2.0 s to pass the man.

What is the length of the train?

A 20 m **B** 38 m **C** 40 m **D** 80 m

3. June/2022/Paper_12/No.2

What is used to determine the distance travelled by an object in motion?

A the area under a distance–time graph

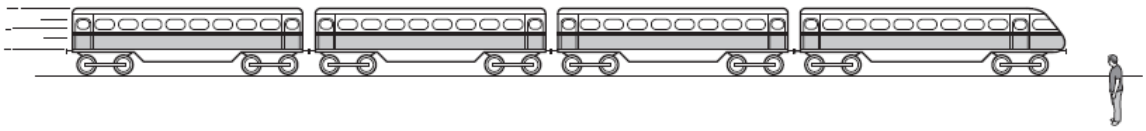
B the area under a speed–time graph

C the gradient of a distance–time graph

D the gradient of a speed–time graph

4. June/2022/Paper_12/No.3

A man stands next to a railway track.



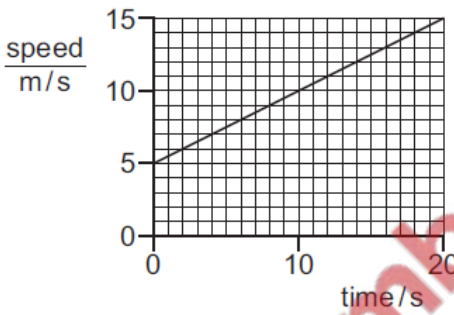
A train travelling at 40 m / s takes 2.0 s to pass the man.

What is the length of the train?

A 20 m **B** 38 m **C** 40 m **D** 80 m

5. June/2022/Paper_13/No.2

The graph shows the motion of a car.

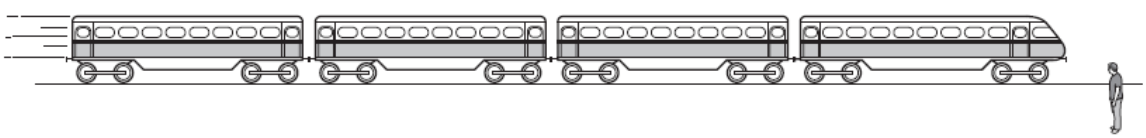


Which row correctly describes this motion?

	acceleration	distance travelled / m
A	constant	200
B	constant	300
C	increasing at a constant rate	200
D	increasing at a constant rate	300

6. June/2022/Paper_13/No.3

A man stands next to a railway track.



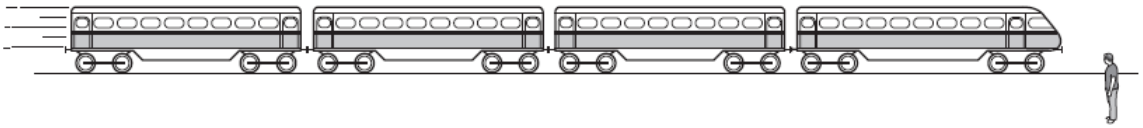
A train travelling at 40 m / s takes 2.0 s to pass the man.

What is the length of the train?

A 20 m **B** 38 m **C** 40 m **D** 80 m

7. June/2022/Paper_21/No.2

A man stands next to a railway track.



A train travelling at 40 m / s takes 2.0 s to pass the man.

What is the length of the train?

A 20 m **B** 38 m **C** 40 m **D** 80 m

8. June/2022/Paper_21/No.3

A speed–time graph is used to describe the motion of an object.

Which quantities are calculated from the gradient of the graph and from the area under the graph?

	gradient of the graph	area under the graph
A	acceleration	distance travelled
B	acceleration	total journey time
C	distance travelled	acceleration
D	total journey time	distance travelled

9. June/2022/Paper_22/No.2

A man stands next to a railway track.

A train travelling at 40 m / s takes 2.0 s to pass the man.

What is the length of the train?

A 20 m **B** 38 m **C** 40 m **D** 80 m

10. June/2022/Paper_22/No.3

Which quantity is equal to acceleration?

A area under a distance–time graph

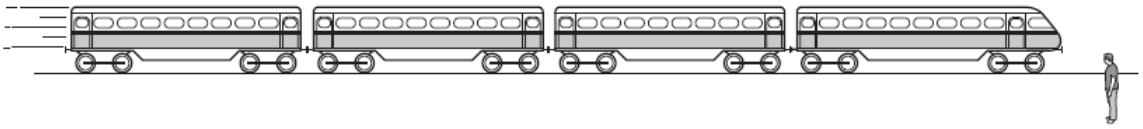
B area under a speed–time graph

C gradient of a distance–time graph

D gradient of a speed–time graph

11. June/2022/Paper_23/No.2

A man stands next to a railway track.



A train travelling at 40 m / s takes 2.0 s to pass the man.

What is the length of the train?

A 20 m **B** 38 m **C** 40 m **D** 80 m

12. June/2022/Paper_23/No.3

A skydiver jumps from an aeroplane and falls towards the Earth.

Which statement is correct when the skydiver has reached terminal velocity?

A The skydiver's speed is decreasing.

B The skydiver's speed is increasing.

C The skydiver is moving with constant speed.

D The skydiver's speed is zero.

13. June/2022/Paper_31/No.2

Fig. 2.1 shows the speed–time graphs for two cars, A and B.

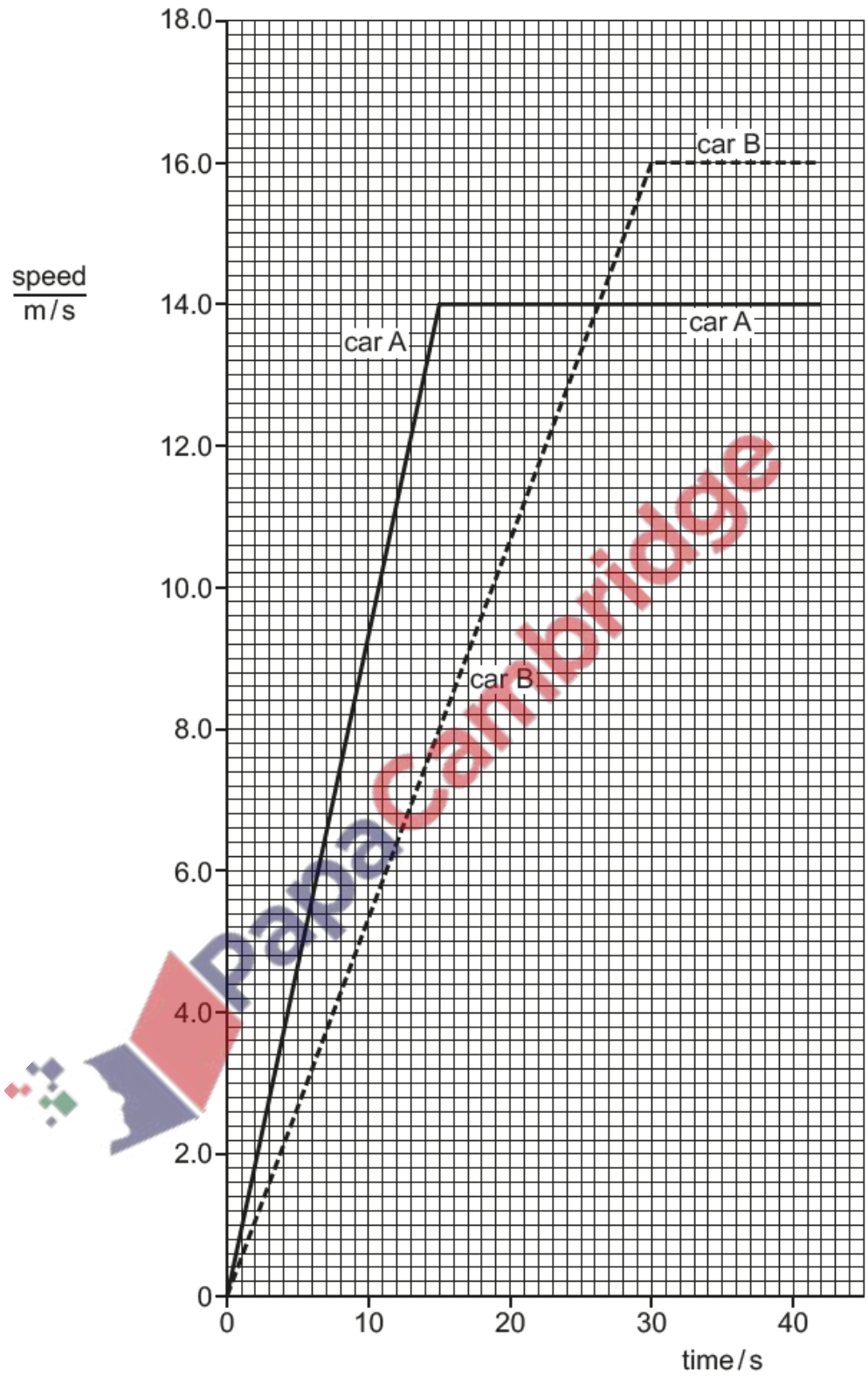


Fig. 2.1

(a) **(i)** Determine the speed of car A at time = 10 s.

speed = ... m/s [2]

14. June/2022/Paper_32/No.1

A student investigates the motion of a trolley as it travels down a slope.

(a) The student makes **two** measurements to determine the average speed of the trolley as it travels down the slope.

State the **two** measurements.
For each measurement, suggest the instrument used for making the measurement.

1. measurement ..... instrument used .....

2. measurement ..... instrument used .....

[2]

(b) Fig. 1.1 shows the speed–time graph for a different trolley as it travels down a slope.

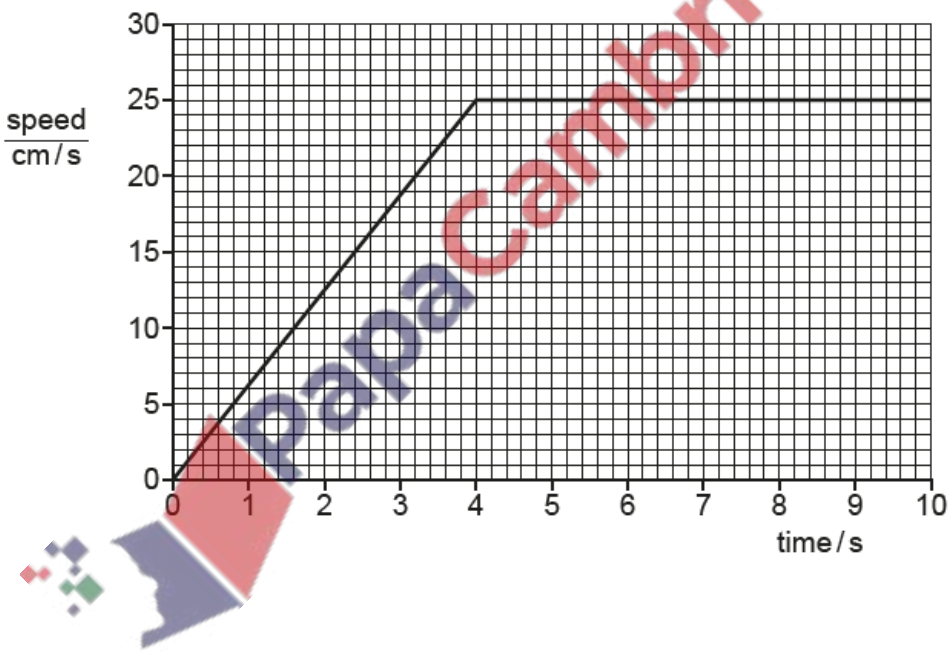


Fig. 1.1

(i) Determine the speed of the trolley at time = 2.0 s.

speed = ... cm / s [2]

(ii) Determine the distance moved by the trolley from time = 0 to time = 4.0 s.

distance = ... cm [3]

(iii) Using the information in Fig. 1.1, describe the motion of the trolley from time = 0 to time = 10 s.

.....

..... [2]

[Total: 9]

15. June/2022/Paper_33/No.1

Fig. 1.1 shows children about to run a race. They have to run 25 m, pick up a small plastic ring and run back to the base line. Each child finishes when they cross the base line holding the plastic ring.

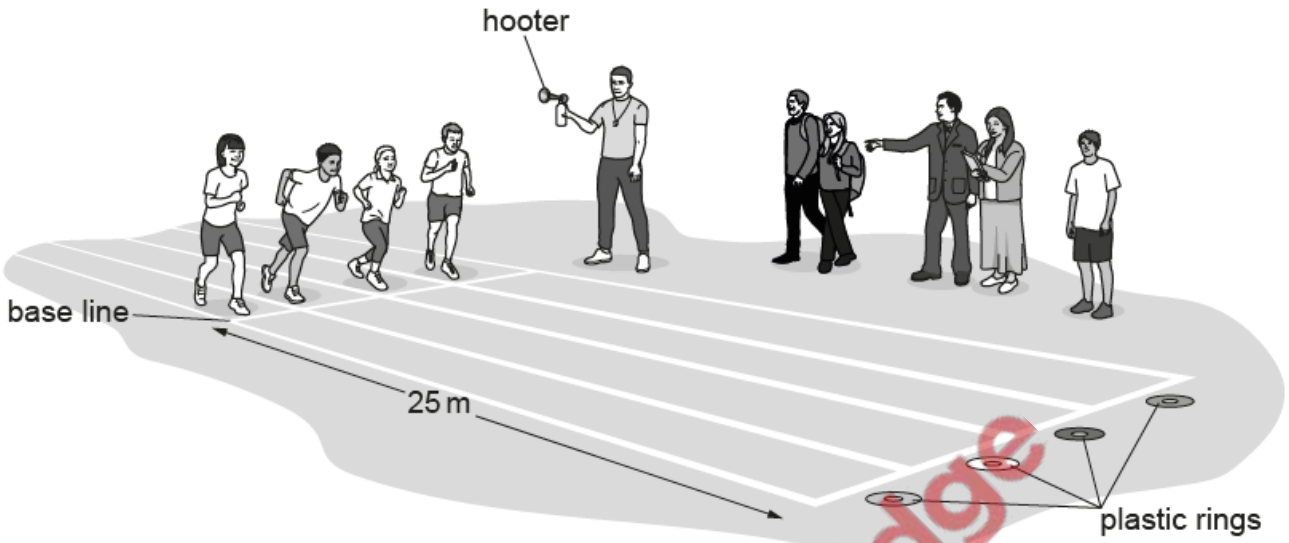


Fig. 1.1

(a) (i) Suggest what equipment the teacher uses to measure the length of 25 m.

..... [1]

(ii) Determine the total distance for the race.

distance = ... m [1]

(b) The teacher records the following information for **one** of the children.

The child starts to run at time = 0.
The child picks up the ring at time = 9.0 s.
The child finishes the race at time = 17.0 s.
The highest speed occurs as the child finishes the race.

Using this information, sketch a speed–time graph on Fig. 1.2, suggesting how the speed of this child varies during the race.

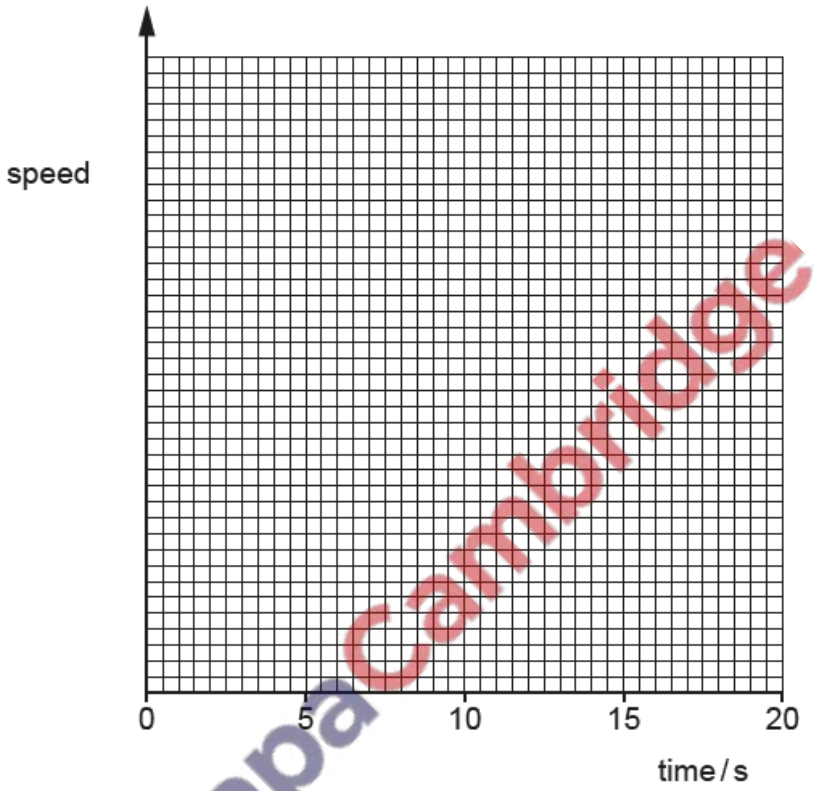


Fig. 1.2

[3]

(c) In a different race, a child runs 500 m in 4 minutes and 20 seconds.

(i) Determine how many seconds there are in 4 minutes and 20 seconds.

time = ... s [1]

(ii) Calculate the average speed of the child.

average speed = ... m / s [3]

[Total: 9]

16. June/2022/Paper_41/No.1

A car of mass m is travelling along a straight, horizontal road at a constant speed v.

At time $t = 0$, the driver of the car sees an obstruction in the road ahead of the car and applies the brakes.

The car does **not** begin to decelerate at $t = 0$.

(a) Explain what is meant by deceleration.

.....

.....

..... [2]

(b) Suggest **one** reason why the car does **not** begin to decelerate at $t = 0$.

.....

..... [1]

(c) Fig. 1.1 is the distance–time graph for the car from $t = 0$.

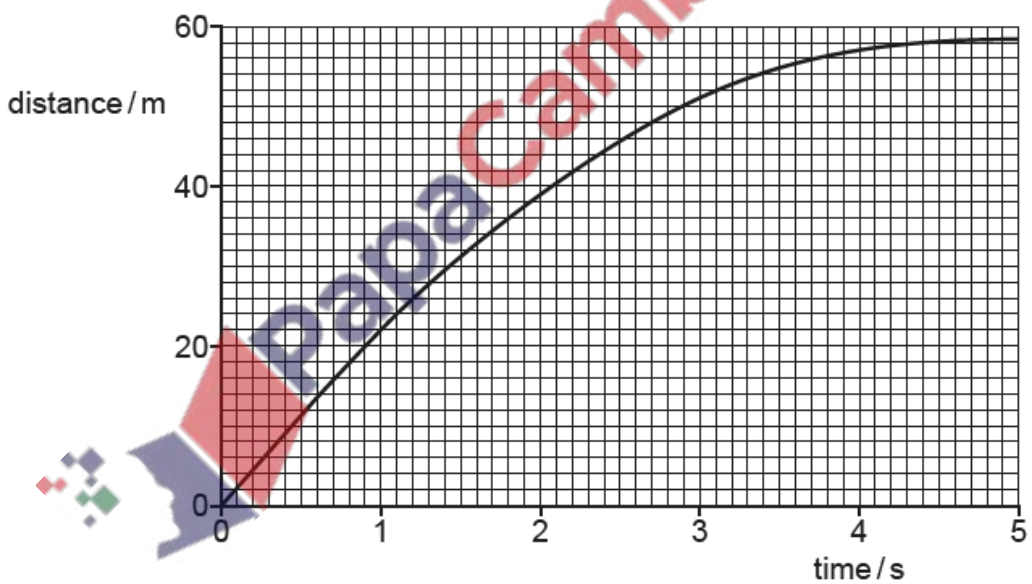


Fig. 1.1

(i) State the property of a distance–time graph that corresponds to speed.

..... [1]

(ii) Using Fig. 1.1, determine the initial speed v of the car.

v = ... [2]

(d) When the car is decelerating, there is a constant resistive force F on the car due to the brakes.

The deceleration of the car is greater than $\frac{F}{m}$ and is **not** constant.

Explain why:

(i) the deceleration of the car is greater than $\frac{F}{m}$

.....

..... [1]

(ii) the deceleration is **not** constant.

.....

.....

..... [2]

[Total: 9]