KS3 SCIENCE · PHYSICS

Speed and motion: exam questions

Name _____
Total: 22 marks

1 State the equation that links speed, distance and time. **[1 mark]**

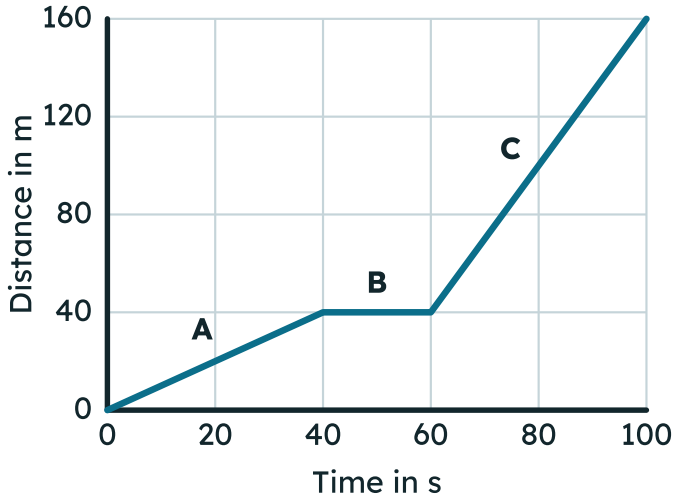
2 Name two units of speed. **[2 marks]**

3 A runner covers 400 m in 80 s. Calculate her average speed. Give the unit. **[2 marks]**

4 A train travels at a steady speed of 40 m/s for 20 s. Calculate how far it travels. **[2 marks]**

5 A car travels 180 km in 3 hours. For part of the journey it is stuck in traffic. **[3 marks]**
(a) Calculate its average speed. Give the unit.
(b) Explain why this is called an average speed.

6 The graph shows a girl's journey to school. **[5 marks]**



(a) Describe her motion in part B.

(b) State the part in which she moves fastest, and how the graph shows this.

(c) Calculate her speed in part A. Give the unit.

7 A line on a distance-time graph curves upwards and gets steeper. State what this shows about the speed of the object. **[1 mark]**

8 A cyclist rides at 5 m/s. A runner runs at 12 km/h. A speed of 5 m/s is the same as 18 km/h. State who is faster, and give a reason. **[2 marks]**

9 A car travels along a motorway at 32 m/s. **[2 marks]**
(a) It overtakes a van that travels the same way at 27 m/s. Calculate the speed of the car relative to the van.
(b) A lorry on the other side of the motorway travels the opposite way at 20 m/s. Calculate the relative speed of the car and the lorry.

10 A passenger sits on a train that travels at 30 m/s. She looks at the passenger in the seat opposite. Explain why that passenger does not seem to be moving. **[2 marks]**

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Speed and motion: mark scheme

Total: 22 marks

1 [1 mark]

- speed = distance ÷ time (accept: distance = speed × time, or time = distance ÷ speed) **(1)**

2 [2 marks]

- Any one of: metres per second (m/s), kilometres per hour (km/h), miles per hour (mph) **(1)**
- A second, different unit from that list (accept any other correct unit of speed, such as cm/s) **(1)**

3 [2 marks]

- 400 ÷ 80 = 5 **(1)**
- Unit: m/s (accept: metres per second) **(1)**

4 [2 marks]

- distance = speed × time (accept: 40 × 20) **(1)**
- 800 m **(1)**

5 [3 marks]

- (a) 180 ÷ 3 = 60 **(1)**
- (a) Unit: km/h (accept: kilometres per hour) **(1)**
- (b) Its speed changed during the journey (accept: it is the total distance divided by the total time) **(1)**

6 [5 marks]

- (a) She is stationary (accept: not moving, stopped, waiting) **(1)**
- (b) Part C **(1)**
- (b) It has the steepest line (accept: the biggest gradient) **(1)**
- (c) 40 ÷ 40 = 1 **(1)**
- (c) Unit: m/s (accept: metres per second) **(1)**

7 [1 mark]

- The speed is increasing (accept: it is speeding up, it is accelerating) **(1)**

8 [2 marks]

- The cyclist **(1)**
- In the same unit, 18 km/h is bigger than 12 km/h (accept: a correct comparison in m/s, such as 12 km/h is about 3.3 m/s, which is less than 5 m/s) **(1)**

9 [2 marks]

- (a) 32 − 27 = 5 m/s **(1)**
- (b) 32 + 20 = 52 m/s **(1)**

10 [2 marks]

- Both passengers move at the same speed in the same direction **(1)**
- So their relative speed is zero (accept: neither moves relative to the other) **(1)**