

Past-paper walk-through

2.1.1

Describing motion and displacement–time graphs

A-Level Physics

Questions in this set

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Questions in this set

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p.18

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- 9702/12 J22 Q5 ■ 1 mark

p.20

A car travels anticlockwise along a horizontal circular road of radius...

Question 5

9702/12 N23 ■ Q5 ■ 1 mark

What is the definition of acceleration?

[1]

- A** the rate of change of displacement
- B** the rate of change of kinetic energy
- C** the rate of change of momentum
- D** the rate of change of velocity

Solution 5

- A** the rate of change of displacement
- B** the rate of change of kinetic energy
- C** the rate of change of momentum
- D** the rate of change of velocity



Answer: **D**

Question 4

9702/12 J24 ■ Q4 ■ 1 mark

Which statement is not correct?

[1]

- A** Acceleration can be determined from the gradient of a velocity–time graph.
- B** Acceleration is the rate of change of velocity.
- C** Displacement can be determined from the area under a velocity–time graph.
- D** Velocity is the rate of change of distance.

Solution 4

- A** Acceleration can be determined from the gradient of a velocity–time graph.
- B** Acceleration is the rate of change of velocity.
- C** Displacement can be determined from the area under a velocity–time graph.
- D** Velocity is the rate of change of distance. 

Answer: **D**

Question 5

9702/11 J23 ■ Q5 ■ 1 mark

One object moves directly from P to R.

In a shorter time, a second object moves from P to Q to R.

Which statement about the two objects is correct for the journey from P to R? **[1]**

A They have the same average speed.

B They have the same average velocity.

C They have the same displacement.

D They travel the same distance.

Solution 5

A They have the same average speed.

B They have the same average velocity.

C They have the same displacement.



D They travel the same distance.

Answer: **C**

Question 8

9702/11 J24 ■ Q8 ■ 1 mark

An aircraft flies from London to Sydney in a time of 21 hours 40 minutes.

The distance travelled is 17 000 km.

What is the average speed of the aircraft?

[1]

A 2.2 m s^{-1}

B $2.2 \times 10^7 \mu\text{m s}^{-1}$

C $2.2 \times 10^{11} \text{ nm s}^{-1}$

D $2.2 \times 10^6 \text{ mm s}^{-1}$

Solution 8

A 2.2 m s^{-1}

B $2.2 \times 10^7 \mu\text{m s}^{-1}$

C $2.2 \times 10^{11} \text{ nm s}^{-1}$



D $2.2 \times 10^6 \text{ mm s}^{-1}$

Answer: **C**

Question 5

9702/13 N23 ■ Q5 ■ 1 mark

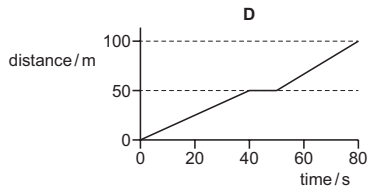
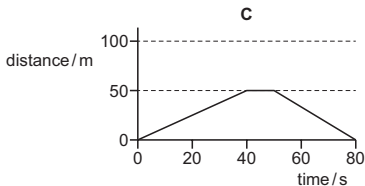
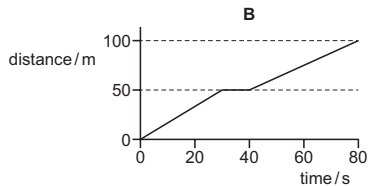
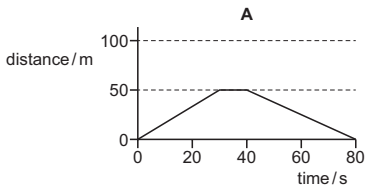
A student walks at a constant speed for a distance of 50 m in a time of 40 s. The student rests for a time of 10 s and then walks back to the starting point at a constant speed in a time of 30 s.

What is the distance–time graph for the motion of the student?

[1]**A** Graph A**B** Graph B**C** Graph C**D** Graph D

Question 5

A student walks at a constant speed for a distance of ... in a time of



Solution 5

A Graph A

B Graph B

C Graph C

D Graph D



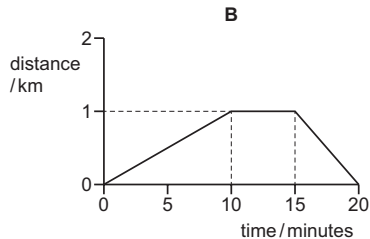
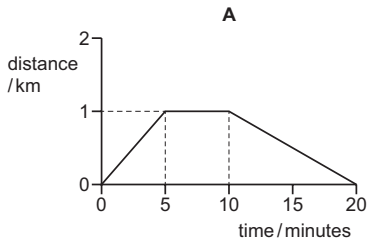
Answer: **D**

Question 5

9702/14 J25 ■ Q5 ■ 1 mark

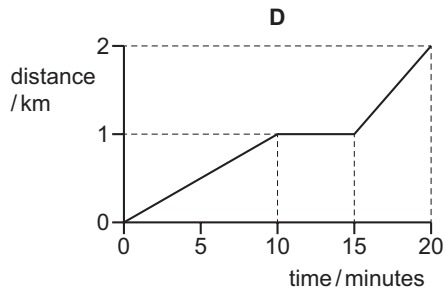
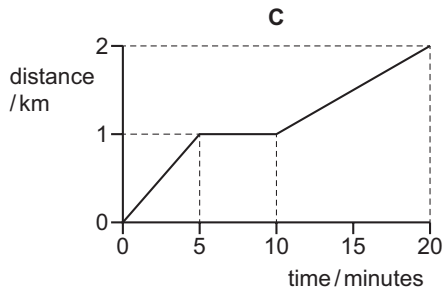
- 5 A student cycles uphill from home to a shop, taking 10 minutes. The student then spends 5 minutes in the shop before cycling home downhill at twice the initial speed.

Which graph could show the variation with time of the distance travelled by the student?



Question 5

9702/14 J25 ■ Q5 ■ 1 mark



Solution 5

Answer: **D**

Question 6

9702/11 N24 ■ Q6 ■ 1 mark

A person, travelling on a motorway a total distance of 200 km, travels the first 90 km at an average speed of 80 km h^{-1} .

Which average speed must be obtained for the rest of the journey if the person is to reach the destination in a total time of 2 hours 0 minutes? [1]

A 110 km h^{-1}

B 120 km h^{-1}

C 122 km h^{-1}

D 126 km h^{-1}

Solution 6

A 110 km h⁻¹

B 120 km h⁻¹

C 122 km h⁻¹

D 126 km h⁻¹

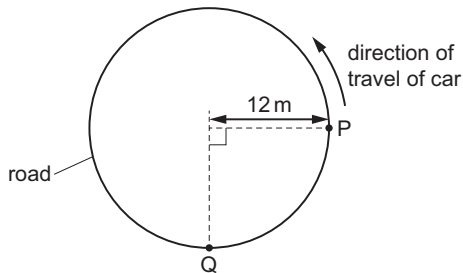


Answer: **D**

Question 5

9702/12 J22 ■ Q5 ■ 1 mark

- 5** A car travels anticlockwise along a horizontal circular road of radius 12 m, as shown.
- The car takes a time of 4.0 s to move from position P to position Q.



Question 5

9702/12 J22 ■ Q5 ■ 1 mark

What is the magnitude of the average velocity of the car for the journey from P to Q?

A 4.2 m s^{-1}

B 4.7 m s^{-1}

C 6.0 m s^{-1}

D 14 m s^{-1}

Solution 5

Answer: **A**