FREE REVISION PACK

Motion Graphs

AQA A-level Physics · 7407 / 7408 · Specification 3.4.1.3

Easy | Medium | Multiple choice · past-paper questions

6	6	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	From velocity–time to acceleration–time	AQA June 2016 · AS Paper 2 · Q19	1 mark
2	Easy	Distance between two cars	AQA June 2019 · A-level Paper 1 · Q13	1 mark
3	Easy	Bouncing ball velocity–time graph	AQA June 2017 · A-level Paper 1 · Q23	1 mark
4	Medium	From speed–time to distance–time	AQA 2020 · AS Paper 2 · Q22	1 mark
5	Medium	Speed from an acceleration–time graph	AQA June 2024 · AS Paper 2 · Q19	1 mark
6	Medium	Displacement from a velocity–time graph	AQA 2021 · AS Paper 2 · Q23	1 mark

Key ideas to have ready

- Gradient of a displacement–time graph = velocity. Gradient of a velocity–time graph = acceleration.
- Area under a velocity–time graph = displacement. Area under an acceleration–time graph = change in velocity.
- Area below the time axis on a velocity–time graph means motion in the opposite direction: subtract it for displacement, add it for total distance.
- A curved graph means the gradient (rate of change) is changing. Read the gradient at a point from a tangent.

How to use this pack

1. The questions are grouped into levels (Easy and Medium). Work through them in order, and check your answers at the end of each level before moving on.
2. Every question is multiple choice with one correct answer. Write down your working anyway; that is how you find mistakes.
3. The separate mark scheme uses the same numbers and explains every answer.

Levels are based on how students did in AQA's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

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Easy

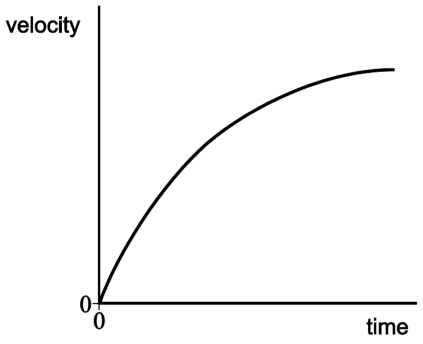
Definitions and one-step ideas. Most students get these right.

Questions 1–3

Only **one** answer per question is allowed. For each question, completely fill in the circle alongside the appropriate answer.

AQA June 2016 · AS Paper 2 · Q19

1 The velocity–time graph for a falling object is shown.



Which of the following shows the corresponding acceleration–time graph?

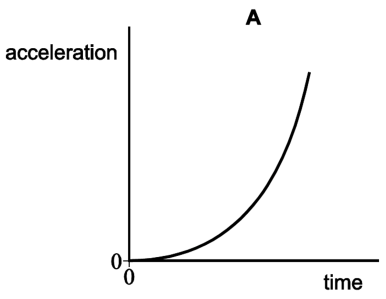
[1 mark]

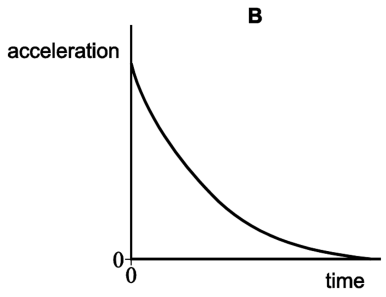
A ⬭

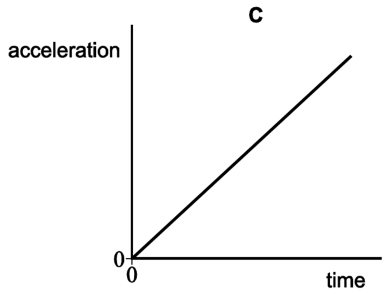
B ⬭

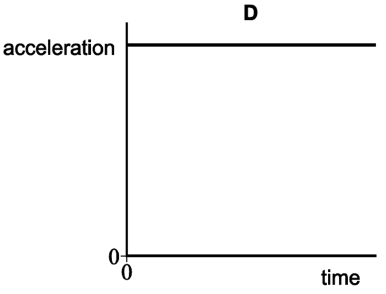
C ⬭

D ⬭



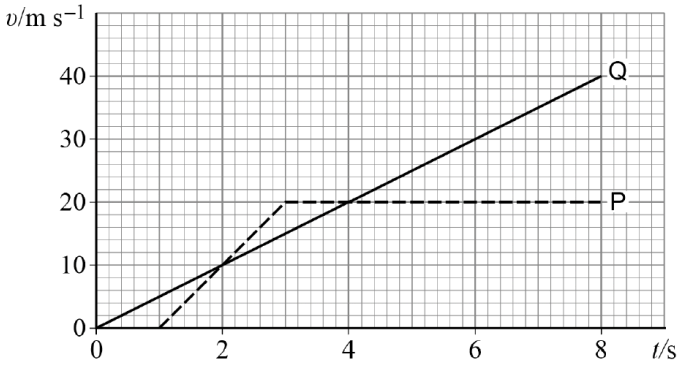






AQA June 2019 · A-level Paper 1 · Q13

2 Two cars **P** and **Q** leave from the same point and travel in the same direction.
Q leaves at time $t = 0$ and **P** leaves one second later.
The figure shows the velocity–time graph for **P** and **Q**.



What is the distance between **Q** and **P** when $t = 8$ s?

[1 mark]

A 40 m ⬭

B 80 m ⬭

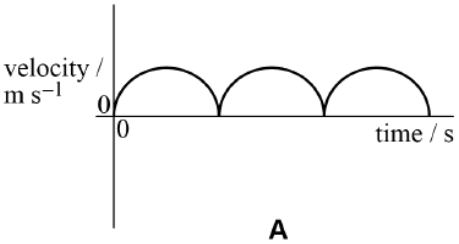
C 160 m ⬭

D 180 m ⬭

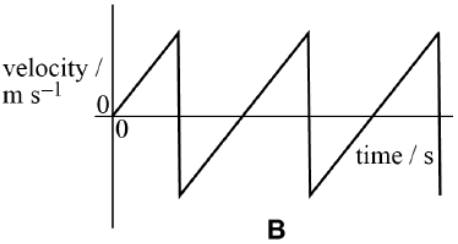
AQA June 2017 · A-level Paper 1 · Q23

3 Which graph best represents the velocity–time graph for a ball that is dropped from rest and bounces repeatedly?

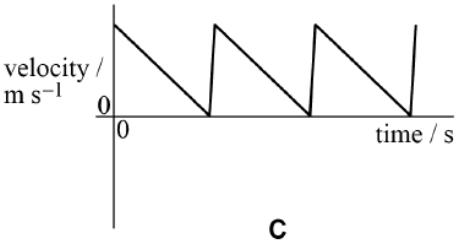
[1 mark]



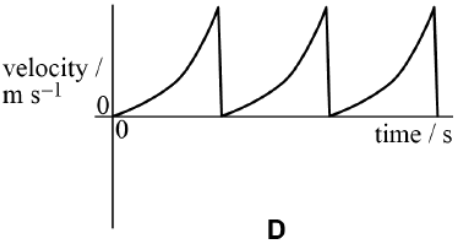
A



B



C



D

A ⬭

B ⬭

C ⬭

D ⬭

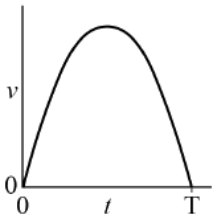
Medium

Two or three steps. Roughly a third to a half of students get these right.

Questions 4–6

AQA 2020 · AS Paper 2 · Q22

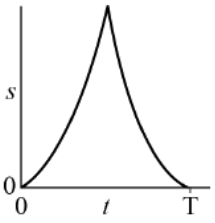
4 The diagram shows how the speed v of an object varies with time t.



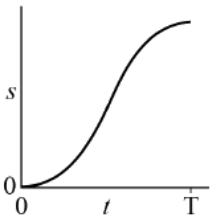
Which graph shows the variation of distance s with t for the object?

[1 mark]

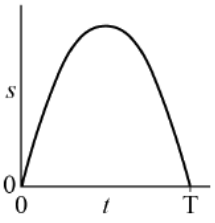
A



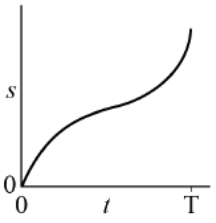
B



C

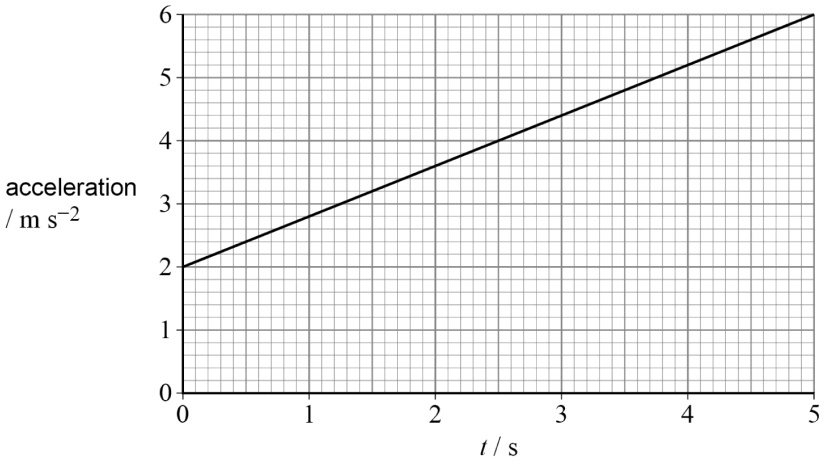


D



AQA June 2024 · AS Paper 2 · Q19

5 The graph shows the variation with time t of the acceleration of an object moving in a straight line.



When $t = 0$ the speed of the object is $4.0\ \text{m s}^{-1}$.

What is the speed of the object when $t = 5.0$ s?

[1 mark]

A $10\ \text{m s}^{-1}$ ⬭

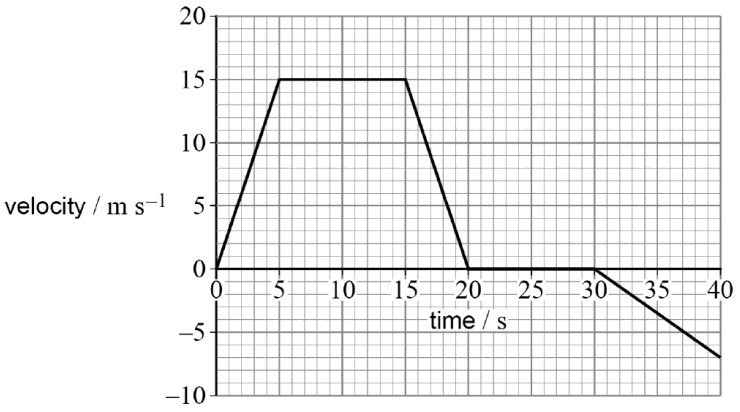
B $14\ \text{m s}^{-1}$ ⬭

C $20\ \text{m s}^{-1}$ ⬭

D $24\ \text{m s}^{-1}$ ⬭

AQA 2021 · AS Paper 2 · Q23

6 A vehicle travels on a straight road, starting at time $t = 0$
The graph shows how its velocity varies with time.



What is the distance of the vehicle from its start position when $t = 40$ s?

[1 mark]

A 115 m ⬭

B 190 m ⬭

C 260 m ⬭

D 370 m ⬭

End of questions. Check your answers with the matching mark scheme. More free packs and 1-to-1 tuition:
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