FREE REVISION PACK

Progressive Waves

AQA A-level Physics · 7407 / 7408 · Specification 3.3.1.1

Easy | Medium | Multiple choice · past-paper questions

6	6	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Length of a sonar pulse	AQA June 2019 · AS Paper 2 · Q15	1 mark
2	Easy	Reading λ and T from two graphs	AQA November 2021 · A-level Paper 1 · Q17	1 mark
3	Easy	Labelling a displacement–distance graph	AQA November 2020 · A-level Paper 1 · Q15	1 mark
4	Medium	Amplitude and period of a mass on a spring	AQA June 2022 · AS Paper 2 · Q14	1 mark
5	Medium	Length of a pulse on a spring	AQA June 2022 · AS Paper 2 · Q16	1 mark
6	Medium	Circular wave in a beaker after 1.0 s	AQA June 2025 · AS Paper 2 · Q15	1 mark

Key ideas to have ready

- A progressive wave transfers energy without transferring matter. Particles oscillate about fixed positions.
- **Amplitude**: maximum displacement from equilibrium. **Wavelength** λ: length of one complete wave. **Period** T: time for one oscillation; f = 1/T.
- Wave speed v = fλ = λ / T. A displacement–distance graph shows λ; a displacement–time graph shows T.
- A pulse lasting time t has length v × t, and N complete oscillations have length Nλ.

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 2019 · AS Paper 2 · Q15

1 A sonar transmitter on a ship produces pulses of sound waves.
Each pulse of sound waves contains 12 complete oscillations.
The frequency of these waves is 8.0 kHz and the speed of sound in seawater is 1.5×10^3 m s^{-1}.

What is the length of one pulse in seawater?

[1 mark]

A 0.188 m ⬭

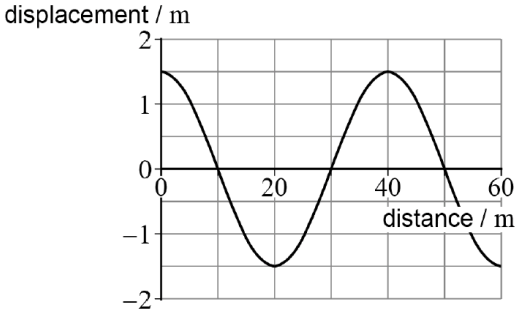
B 2.25 m ⬭

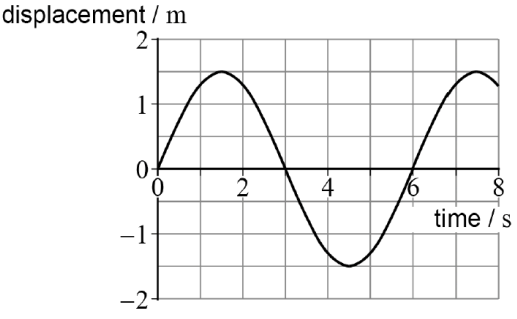
C 2.25×10^3 m ⬭

D 1.44×10^5 m ⬭

AQA November 2021 · A-level Paper 1 · Q17

2 The diagrams show the displacement–distance graph for a wave and the displacement–time graph for a point in the wave.





Which is correct for this wave?

[1 mark]

A The amplitude is 3.0 m. ⬭

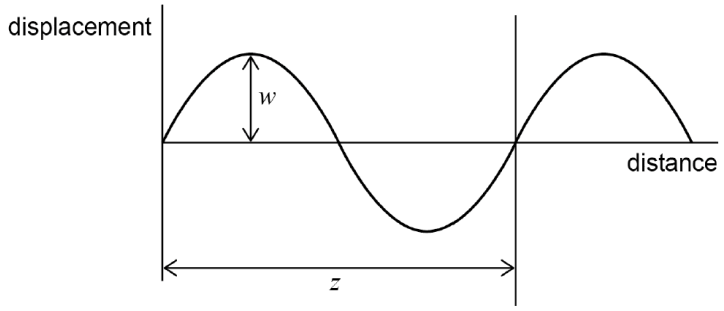
B The wavelength is 6 m. ⬭

C The speed is 8.3 m s^{-1}. ⬭

D The frequency is 0.17 Hz. ⬭

AQA November 2020 · A-level Paper 1 · Q15

3 A wave travels across the surface of water.
The diagram shows how the displacement of water particles at the surface varies with distance.



Which row correctly describes both w and z?

[1 mark]

	w	z	
A	amplitude	wavelength	⬭
B	half-amplitude	period	⬭
C	half-amplitude	wavelength	⬭
D	amplitude	period	⬭

Medium

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

Questions 4–6

AQA June 2022 · AS Paper 2 · Q14

4 A mass **M** hangs in equilibrium from a vertical spring that obeys Hooke's law.
M is pulled down by $10\ \text{cm}$ and then released to oscillate about the equilibrium position.
M returns to the equilibrium position for the first time $0.50\ \text{s}$ after release.

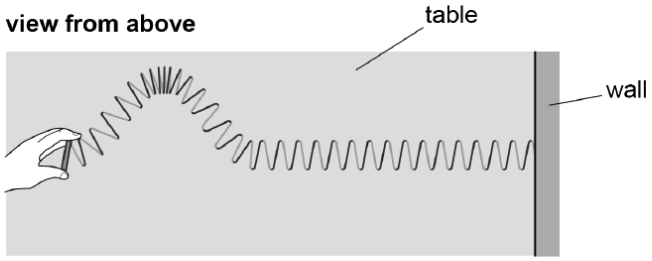
Which row gives the amplitude and the period of the oscillations?

[1 mark]

	Amplitude / cm	Period / s	
A	10	1.0	⬭
B	10	2.0	⬭
C	20	2.0	⬭
D	20	1.0	⬭

AQA June 2022 · AS Paper 2 · Q16

5 A long spring is used to demonstrate wave motion. The spring lies horizontally on a table.
One end of the spring is attached to a wall.



The free end of the spring is quickly moved to one side and then back to the centre, creating a pulse.
This movement takes $0.40\ \text{s}$.
The pulse travels $4.0\ \text{m}$ along the spring in a time of $2.0\ \text{s}$.

What is the length of the pulse?

[1 mark]

A $0.8\ \text{m}$ ⬭

B $1.6\ \text{m}$ ⬭

C $2.0\ \text{m}$ ⬭

D $10.0\ \text{m}$ ⬭

AQA June 2025 · AS Paper 2 · Q15

6 A cylindrical beaker contains water. The diameter of the water surface is $200\ \text{mm}$.

A pencil is dipped into the centre of the surface at time $t = 0$
A circular wave travels outwards on the surface from the pencil.

The speed of the wave on the surface is $150\ \text{mm s}^{-1}$.

Which row shows the radius of the wave and the direction of travel of the wave when $t = 1.0\ \text{s}$?

[1 mark]

	Radius of wave / mm	Direction of travel	
A	50	towards centre	⬭
B	50	away from centre	⬭
C	150	towards centre	⬭
D	150	away from centre	⬭

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