GET BETTER AT PHYSICS · MARK SCHEME

Phase & Path Difference: tiered multiple choice

AQA A-level Physics · 7407 / 7408 · Specification 3.3.1.1, 3.3.2.1 · 6 questions · 6 marks

1 mark per correct letter | Worked reasoning for every question | **How students did** = from AQA examiner reports, where available

Answer key

Q1	Q2	Q3	Q4	Q5	Q6
C	A	C	C	A	A

Easy

Questions 1–3

1 **C**

Path difference in wavelengths · AQA June 2018 · A-level Paper 1 · Q15

λ = v / f = 30 ÷ 50 = 0.60 m. Path difference = (20 + 18) − 30 = 8.0 m. In wavelengths: 8.0 ÷ 0.60 = 13.3λ.

How students did: 78.0% of students got this right in June 2018.

2 **A**

Converting radians to degrees · AQA 2020 · AS Paper 2 · Q13

0.41 rad × (180° ÷ π) = 0.41 × 57.3° = 23°.

Watch out: π rad = 180°; your calculator must be in the right mode if you use it to convert.

3 **C**

Wave speed from a phase difference · AQA June 2025 · AS Paper 2 · Q9

A phase difference of π/2 is a quarter of a wavelength, so λ/4 = 0.040 m and λ = 0.16 m. $v = f\lambda = 400 \times 0.16 = 64$ m s^{-1}.

Watch out: 16 m s^{-1} (A) uses 0.040 m as the full wavelength.

How students did: In June 2025 the correct answer was the most popular choice.

Medium

Questions 4–6

4 **C**

Phase difference on a sound wave · AQA June 2016 · AS Paper 2 · Q12

λ = v / f = 330 ÷ 256 = 1.29 m. Phase difference = 2π × 0.16 ÷ 1.29 = 0.25π = π/4 rad.

Watch out: One whole wavelength is 2π rad. Using π per wavelength gives π/8 (A).

How students did: 45% of students got this right in June 2016; about 35% chose A.

5 **A**

Statements about points on a transverse wave · AQA November 2020 · A-level Paper 1 · Q16

S is three-quarters of a wavelength from P, a phase difference of 3π/2, which is the same as π/2 measured the other way: A is correct. λ = 24 ÷ 4.0 = 6.0 cm, so P to R (half a wavelength) is 3.0 cm, not 6.0 cm. Q is at a crest, where the particle velocity is zero. P and R are in antiphase.

Watch out: Particles move fastest as they pass through equilibrium, not at a crest.

How students did: In November 2020 a wrong answer was more popular than the correct one.

6 **A**

Frequency from a phase difference · AQA June 2018 · AS Paper 2 · Q19

π/6 rad is 1/12 of a cycle, so 0.12 m = λ / 12 and λ = 1.44 m. f = v / λ = 340 ÷ 1.44 = 236 Hz ≈ 240 Hz.

Watch out: Divide the phase difference by 2π (not by π) to get the fraction of a wavelength.

How students did: Just over 40% of students got this right in June 2018.

End of mark scheme. Answers from AQA's published keys; explanations written for this pack. AQA material is © AQA. More free packs and 1-to-1 tuition: **www.getbetteratphysics.co.uk**

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