

Exercise walk-through

Diffraction ■ 14.7

eXercise

You must be able to

- describe **diffraction** 衍射 as the spreading of waves around obstacles and through gaps
- relate the amount of diffraction to the ratio of wavelength to gap size
- connect diffraction to the wave nature of light

Method — Diffraction

Waves **spread out** as they pass an obstacle's edge or go through a gap.

Method — How much

Diffraction is greatest when the gap is **about the same size** as the wavelength. A gap much wider than λ gives little spreading.

Method — Evidence for waves

Light diffracts through very narrow slits, which is direct evidence that light behaves as a wave.

Practice 2.1 ■ 1 mark

State what diffraction is.

Solution 2.1

Worked steps

the spreading of waves around obstacles and through gaps **B1**.

Practice 2.2 ■ 1 mark

State when diffraction through a gap is greatest.

Solution 2.2

Worked steps

when the gap is about the same size as the wavelength **B1**.

Practice 2.3 ■ 1 mark

State what the diffraction of light shows about its nature.

Solution 2.3

Method: How much

Worked steps

that light behaves as a wave **B1**.

Exam-style 3.1 ■ 1 mark

Diffraction is the _____ of waves around obstacles.

A speeding up

B spreading

C reflection

D absorption

Solution 3.1

Method: Diffraction

A speeding up

B spreading



C reflection

D absorption

Worked steps

B.

Exam-style 3.2 ■ 1 mark

Diffraction through a gap is greatest when the gap size is

A much larger than the wavelength

B about equal to the wavelength

C zero

D infinite

Solution 3.2

Method: How much

A much larger than the wavelength

B about equal to the wavelength



C zero

D infinite

Worked steps

B.

Exam-style 3.3 ■ 1 mark

Water waves pass through a gap in a barrier.

- (a) Describe what happens to the waves as they pass through.
- (b) State how to make them spread out more (for the same waves).

Solution 3.3

Method: Diffraction

Worked steps

(a) they spread out into the region beyond the gap **B1**. (b) make the gap narrower (closer to the wavelength) **B1** **B1**.