

14.7 Diffraction

Name: _____ Class: _____ Date: _____

Total: 8 marks

Objective

Build the skills to answer exam questions on **diffraction**.

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

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ Diffraction

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

■ 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.

■ Evidence for waves

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

2 Practice

2.1 State what diffraction is. [1]

2.2 State when diffraction through a gap is greatest. [1]

2.3 State what the diffraction of light shows about its nature. [1]

3 Exam-style questions

3.1 Diffraction is the _____ of waves around obstacles. [1]

- **A** speeding up
 - **B** spreading
 - **C** reflection
 - **D** absorption
-

3.2 Diffraction through a gap is greatest when the gap size is [1]

- **A** much larger than the wavelength
 - **B** about equal to the wavelength
 - **C** zero
 - **D** infinite
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3.3 Water waves pass through a gap in a barrier.

(a) Describe what happens to the waves as they pass through. [1]

(b) State how to make them spread out more (for the same waves). [2]

4 Go further

- work through the **14.7 Diffraction** lesson on the **Learn** page;
- read the **Waves and Sound** section of the AP Physics 2 handout on the **Know** page.

Solutions

2.1 the spreading of waves around obstacles and through gaps.

2.2 when the gap is about the same size as the wavelength.

2.3 that light behaves as a wave.

3.1 B.

3.2 B.

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