

# 3.1 Periodic Phenomena

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_ **Total: 9 marks**

**KEY WORDS** period 周期 • amplitude 振幅 • midline 中线 • periodic 周期性 • cycle 周期段

## Objective

Build the skills to answer exam questions on **periodic phenomena**.

**You must be able to:**

- identify the **period** 周期, **amplitude** 振幅, and **midline** 中线 of a periodic function

## 1 Worked examples

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

### ■ Periodic functions

A **periodic** function repeats every **period**  $P$  (the length of one cycle). Its:

- **amplitude**  $= \frac{\text{max} - \text{min}}{2}$ ;
- **midline**  $= \frac{\text{max} + \text{min}}{2}$  (the horizontal centre).

### ■ Example

Max 8, min 2: amplitude = 3, midline = 5.

## 2 Practice

**2.1** Define the period of a periodic function. [1]

**2.2** State how the amplitude relates to the max and min. [1]

**2.3** A wave has max 8 and min 2. Find the amplitude and midline. [2]

## 3 Exam-style questions

**3.1** The period of a periodic function is [1]

- **A** its height
- **B** the length of one cycle
- **C** its maximum
- **D** its slope

**3.2** The amplitude equals [1]

- **A**  $\text{max} - \text{min}$
- **B**  $\frac{\text{max} - \text{min}}{2}$
- **C**  $\frac{\text{max} + \text{min}}{2}$
- **D** max

**3.3** A tide has maximum height 6 m and minimum 0 m, repeating every 12 h.

(a) Find the amplitude. [1]

(b) Find the midline. [1]

(c) State the period. [1]

## Solutions

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**2.1** the length of one complete cycle.

**2.2** amplitude =  $\frac{\max - \min}{2}$ .

**2.3** amplitude =  $\frac{8 - 2}{2} = 3$ ; midline =  $\frac{8 + 2}{2} = 5$ .

**3.1 B.**

**3.2 B.**

**3.3** (a)  $\frac{6 - 0}{2} = 3$  m. (b)  $\frac{6 + 0}{2} = 3$  m. (c) 12 h.