

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** $= \frac{\max - \min}{2}$;
- **midline** $= \frac{\max + \min}{2}$ (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** $\max - \min$
 - **B** $\frac{\max - \min}{2}$
 - **C** $\frac{\max + \min}{2}$
 - **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

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.