

14.1 Properties of Wave Pulses and Waves

Name: _____ Class: _____ Date: _____

Total: 10 marks**KEY WORDS** wave 波 • transverse 横波 • longitudinal 纵波 • amplitude 振幅 • wavelength 波长

Objective

Build the skills to answer exam questions on **properties of wave pulses and waves**.

You must be able to:

- describe a **wave** 波 as a disturbance that transfers energy without transferring matter
- distinguish **transverse** 横波 from **longitudinal** 纵波 waves
- define amplitude and wavelength

1 Worked examples

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

■ What a wave carries

A wave transfers **energy** through a medium **without** transferring matter — the particles just vibrate about fixed positions.

■ Transverse vs longitudinal

- **Transverse** — vibration is perpendicular to the direction of travel (waves on a string, light).
- **Longitudinal** — vibration is along the direction of travel (sound).

■ Amplitude and wavelength

Amplitude is the maximum displacement from rest; **wavelength** is the distance between two matching points on the wave.

2 Practice

2.1 State what a wave transfers and what it does **not** transfer. [2]

2.2 Give one example each of a transverse and a longitudinal wave. [2]

2.3 Define the amplitude of a wave. [1]

3 Exam-style questions

3.1 A wave transfers [1]

- **A** matter only
- **B** energy without matter
- **C** both matter and energy equally
- **D** neither

3.2 Sound is an example of a [1]

- **A** transverse wave
- **B** longitudinal wave
- **C** electromagnetic wave
- **D** standing wave

3.3 A wave travels along a rope, with the rope moving up and down as the wave moves sideways.

(a) Name this type of wave. [1]

(b) State the direction of vibration relative to the direction of travel. [1]

(c) Name the quantity equal to the maximum displacement.

[1]

Solutions

2.1 it transfers energy; it does not transfer matter.

2.2 transverse: a wave on a string (or light); longitudinal: sound.

2.3 the maximum displacement of a particle from its rest position.

3.1 B.

3.2 B.

3.3 (a) a transverse wave. (b) perpendicular to the direction of travel. (c) the amplitude.