

How waves carry energy without matter

Grade 7 science (Year 8 · Class 7) · Test answers (mark scheme)

Use these model answers with the marking notes. Award method marks even when the final number is wrong, provided the formula and substitution are correct, and check that every answer has a sensible unit.

Level: Grade 7 science (Year 8 · Class 7) · **Curriculum:** MS-PS4-1

Question 1 Wave terms (3 marks)

- a. The length of one complete wave, such as crest to crest.
- b. The hertz (Hz).
- c. The amplitude.

Marking: 1 mark each.

Question 2 Types of wave (2 marks)

- a. Longitudinal.
- b. Transverse.

Marking: 1 mark each.

Question 3 Counting at the jetty (3 marks)

- a. $f = N \div t = 36 \div 12 = \mathbf{3.0 \text{ Hz}}$.
- b. $T = 1 \div 3.0 = \mathbf{0.33 \text{ s}}$.

Marking: (a) 1 mark for the formula or substitution, 1 for the answer with unit; (b) 1 mark.

Question 4 Ripple tank (3 marks)

- a. $v = f \times \lambda = 6.0 \times 0.25 = \mathbf{1.5 \text{ m/s}}$.
- b. $t = 0.90 \div 1.5 = \mathbf{0.60 \text{ s}}$.

Marking: (a) 1 mark method, 1 mark answer and unit; (b) 1 mark.

Question 5 Floating cork (2 marks)

The water particles only vibrate up and down around fixed positions. The wave transfers **energy** across the pond but does not carry the water or the cork along.

Marking: 1 mark for vibration in place, 1 mark for energy moving but not matter.

Question 6 Reading two waves (3 marks)

- a. The amplitude of A is **2 cm**.
- b. B repeats every 3 cm: **3 cm**.
- c. B has the shorter wavelength, so at the same speed B has the **higher frequency**.

Marking: 1 mark each part.

Question 7 Two drum beats (2 marks)

The hard hit makes vibrations with a **larger amplitude**. A larger amplitude means the wave carries more energy, so the sound is louder.

Marking: 1 mark for the larger amplitude, 1 mark for more energy giving a louder sound.

Question 8 Sound wavelength (2 marks)

$$\lambda = v \div f = 340 \div 170 = \mathbf{2.0\ m}.$$

Marking: 1 mark for rearranging or substituting, 1 mark for the answer with unit.