Your Science Online

Cambridge IGCSE Physics 0625 style

WAVES

Topic practice paper (exam style)

CANDIDATE NAME	
CLASS	
DATE	

45 minutes

You will need: a pen, a pencil, a ruler and a calculator.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes or in the margins.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 45.
- The number of marks for each question or part question is shown in brackets [ ].
- Questions or parts marked **[Extended]** are for Extended-tier candidates. Core candidates may leave them out (Core total: 32 marks).
- Take the speed of electromagnetic waves in a vacuum to be 3.0×10^8 m/s.
- Topics: transverse and longitudinal waves, amplitude, wavelength, frequency, wave speed, reflection, refraction and diffraction, the electromagnetic spectrum, sound and echoes.

For teacher's use	
Question	**Mark**
1	
2	
3	
4	
5	
6	
Total	

[Turn over

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1 A student moves one end of a long rope up and down. Fig. 1.1 shows the shape of the rope at one instant.

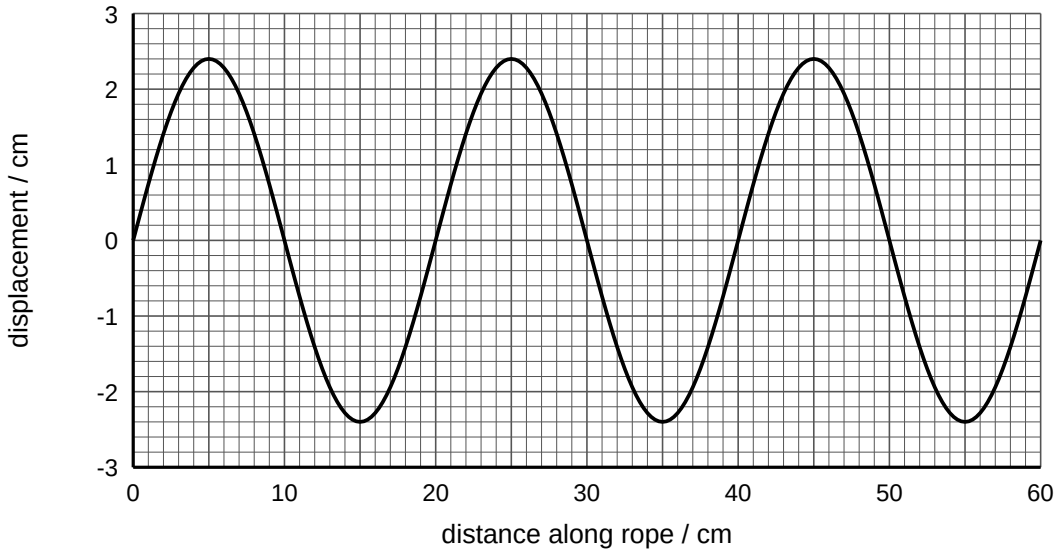

Fig. 1.1

(a) The wave on the rope is a transverse wave. State how the vibrations of a transverse wave differ from the vibrations of a longitudinal wave.

.....

..... [2]

(b) Use Fig. 1.1 to determine:

(i) the amplitude of the wave

amplitude = ... cm [1]

(ii) the wavelength of the wave.

wavelength = ... cm [1]

(c) Four complete waves pass a point on the rope in 2.0 s. Calculate the frequency of the wave.

.....

frequency = ... Hz [2]

(d) Calculate the speed of the wave on the rope. Give your answer in m/s.

.....

.....

speed = ... m/s [2]

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2 Fig. 2.1 shows a view from above of plane water waves in a ripple tank. The waves move towards a barrier with a narrow gap.

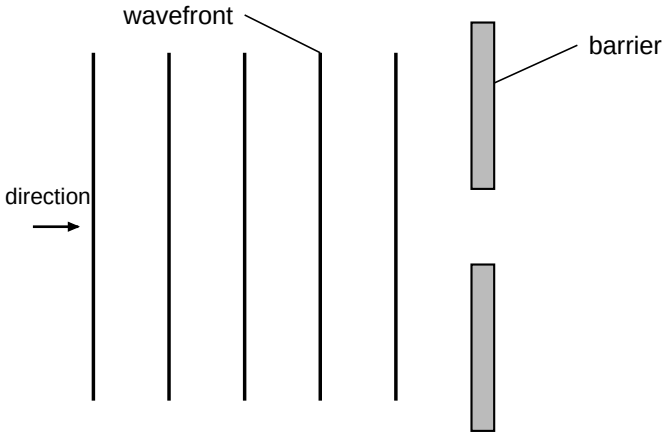

Fig. 2.1

(a) State what is meant by a *wavefront*.

..... [1]

(b) State the name of the effect that happens when the waves pass through the gap.

..... [1]

(c) On Fig. 2.1, draw **three** wavefronts after the waves have passed through the gap.

[2]

(d) State what happens to the wavelength of the waves as they pass through the gap.

..... [1]

(e) ***[Extended]*** The gap is made much wider. Describe how the pattern of the waves after the gap changes.

.....

..... [2]

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3 Fig. 3.1 shows a view from above of water waves moving from deep water into shallow water.

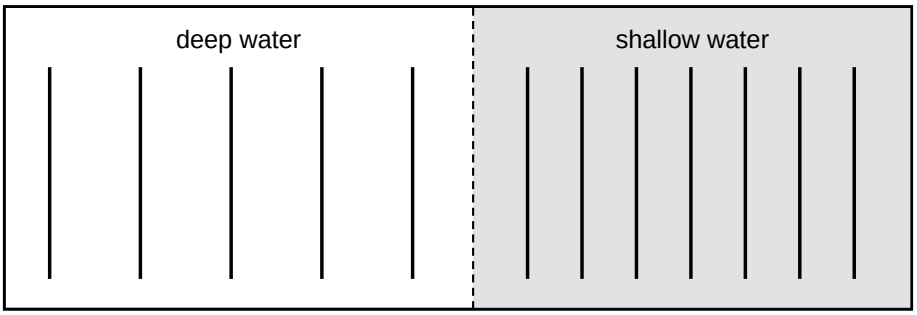

Fig. 3.1

(a) State what happens to the speed, the wavelength and the frequency of the waves as they move into the shallow water.

.....

.....

..... [3]

(b) ***[Extended]*** In the deep water, the speed of the waves is 0.30 m/s and the wavelength is 1.5 cm.

(i) Calculate the frequency of the waves.

.....

frequency = ... Hz [2]

(ii) In the shallow water, the speed of the waves is 0.18 m/s. Calculate the wavelength of the waves in the shallow water.

.....

wavelength = ... cm [2]

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4 Table 4.1 shows the regions of the electromagnetic spectrum. Two regions are labelled **A** and **B**.

radio waves	A	infrared	visible light	B	X-rays	gamma rays

Table 4.1

(a) Name the regions **A** and **B**.

A .....

B ..... [2]

(b) State **one** property that is the same for all electromagnetic waves.

..... [1]

(c) Give **one** use of each of these types of electromagnetic wave.

microwaves

.....

infrared

.....

X-rays

..... [3]

(d) State **one** harmful effect of too much ultraviolet radiation on people.

..... [1]

(e) ***[Extended]*** A radio station broadcasts at a frequency of 1.5×10^8 Hz. Calculate the wavelength of these radio waves.

.....

wavelength = ... m [2]

5 Sound is produced by vibrating objects.

(a) ***[Extended]*** Sound is a longitudinal wave. Describe how a sound wave travels through air. Use the words **compressions** and **rarefactions** in your answer.

.....

..... [2]

(b) State the range of frequencies that a healthy human ear can hear.

range = ... Hz [1]

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(c) A student stands 85 m from a tall wall and claps her hands once. She hears the echo 0.50 s after the clap.

Calculate the speed of sound in air.

.....

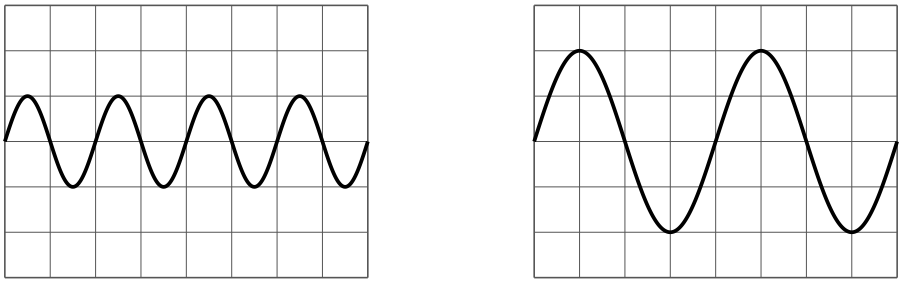
.....

speed = ... m/s [3]

(d) Explain why sound cannot travel through a vacuum.

..... [1]

6 A microphone is connected to an oscilloscope. Fig. 6.1 shows the traces for two different sounds, P and Q. The settings of the oscilloscope are the same for both traces.



trace P **trace Q**

Fig. 6.1

(a) State which sound, P or Q, has the higher pitch. Give a reason for your answer.

sound .....

..... [2]

(b) State which sound, P or Q, is louder. Give a reason for your answer.

sound .....

..... [2]

(c) ***[Extended]*** Each horizontal square on the oscilloscope screen represents 1.0 ms. Calculate the frequency of sound P.

.....

frequency = ... Hz [3]

END OF PAPER

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