



KS3 Science

Waves

Question Paper

Time available: 31 minutes

Marks available: 31 marks

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1.

(a) Water waves are transverse waves. Sound waves are longitudinal waves.

(i) Explain the difference between a transverse wave and a longitudinal wave.

You may include labelled diagrams in your answer.

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(3)

(ii) Name **one** type of wave that may be either transverse or longitudinal.

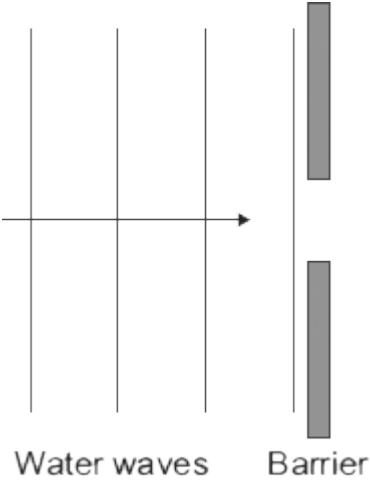
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(1)

(b) The diagram shows water waves in a ripple tank moving towards a gap in a barrier.

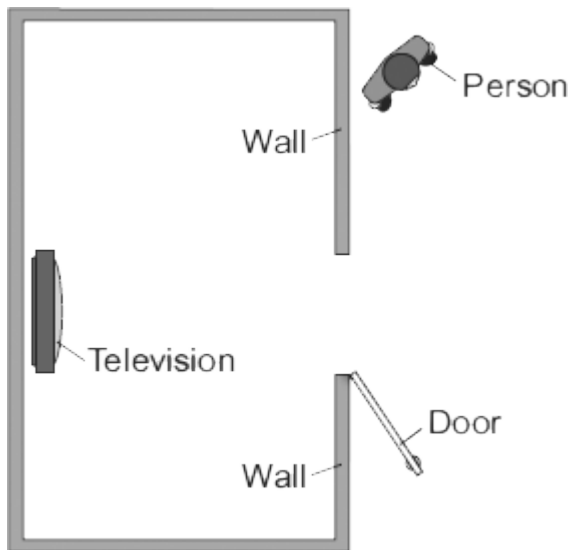
The water waves diffract as they pass through the gap.

Complete the diagram to show the diffracted water waves.



(1)

- (c) A television is switched on inside a room. A person outside the room can hear the television, but only when the door is open.



When the door is open, the person can hear the sound but cannot see the television.

Explain why.

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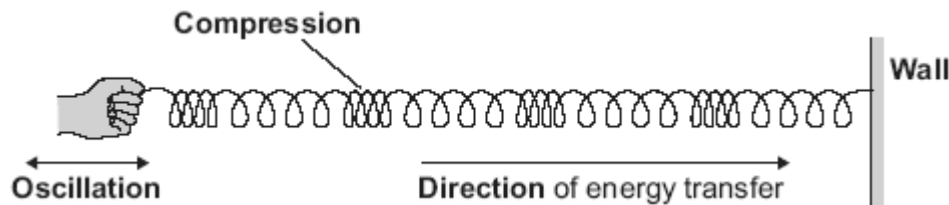
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(2)
(Total 7 marks)

2.

- (a) The diagram shows a longitudinal wave being produced in a stretched spring.



- (i) Use the bold words from the diagram to complete the following sentence. Put only **one** word in each space.

A longitudinal wave is one in which the causing
the wave is parallel to the of energy transfer.

(2)

(ii) Name the type of energy that is transferred by longitudinal waves.

(1)

(b) The diagram shows water waves made by a wave machine in a swimming pool.



Every second, two waves go past a person standing in the swimming pool.

The waves have a wavelength of 0.8 metres.

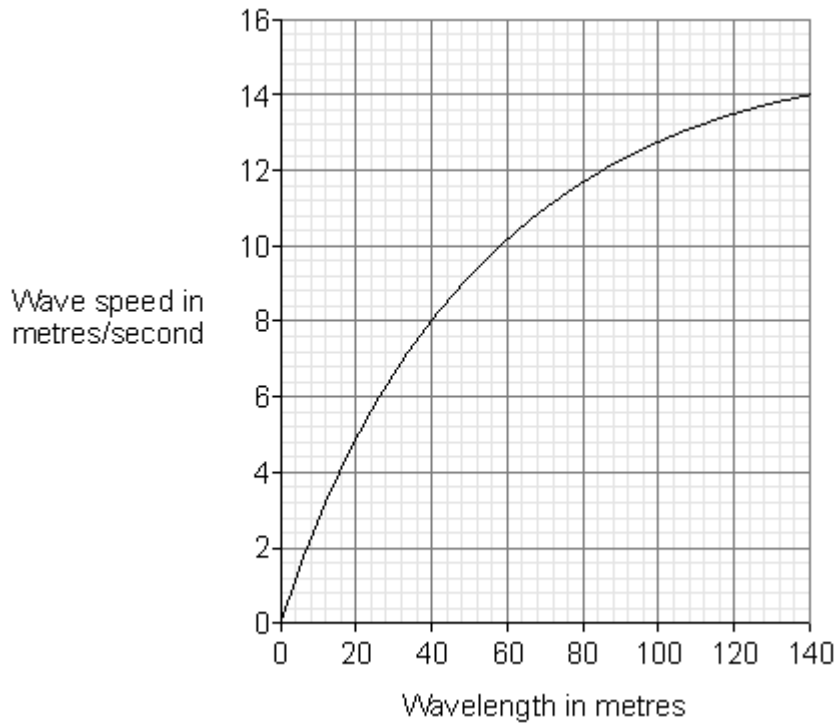
Calculate the speed of the water waves.

Write down the equation you use, and then show clearly how you work out your answer.

Wave speed = m/s

(2)

- (c) The graph shows how the speed of deep ocean waves depends on the wavelength of the waves.

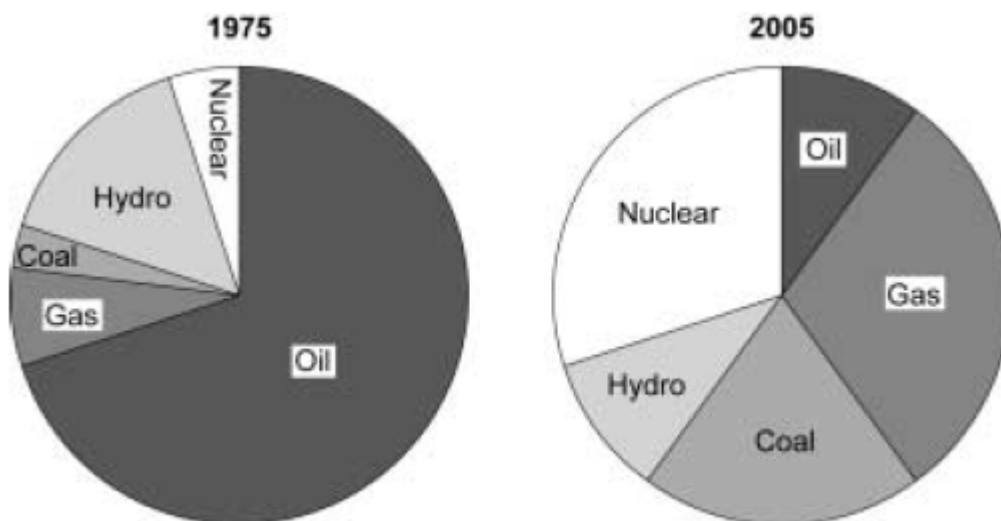


What can you conclude from the graph?

(2)
(Total 7 marks)

3.

The pie charts show the relative proportions of electricity generated in Japan from different energy sources in 1975 and 2005.



- (a) Describe and suggest a reason for **two** differences in the energy sources used in 2005 compared with 1975.

(2)

- (b) Mining for coal often releases large amounts of methane gas. Methane is both explosive and a greenhouse gas. At the Sihe coal mine in China the methane is diverted to a gas burning power station where it is used to generate electricity.

- (i) A newspaper reported a scientist as saying:

If the concentration of greenhouse gases in the atmosphere doubles, the average temperature of the Earth will increase by up to 5 °C over the next 100 years.

What has been stated in the newspaper?

Draw a ring a round your answer.

a fact

a guess

a prediction

Give a reason for your answer.

(2)

- (ii) Explain an environmental advantage of taking the methane gas from coal mines and using it to generate electricity.

- (c) The average person in Britain uses 1930 kWh of electricity each year. Many people in the world's poorest countries do not have access to electricity.

Giving examples, explain why electricity is essential for both improving public health and for modern communications.

(3)

(Total 9 marks)

4.

- (a) A swimming pool has a wave making machine. The diagram shows the water wave pattern for 3 seconds.



- (i) How many water waves are shown in the diagram?

(1)

- (ii) What is the frequency of the water waves?

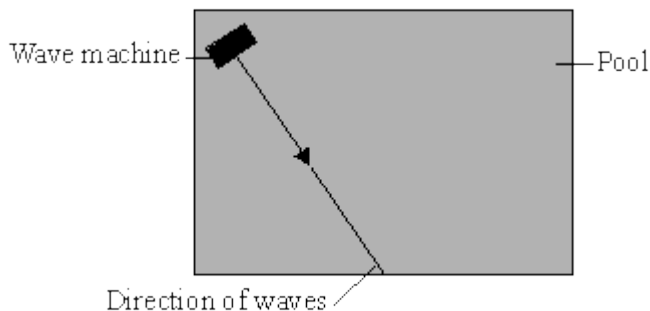
(1)

- (iii) Which **one** of the units below is used to measure frequency? Underline your answer.

hertz joule watt

(1)

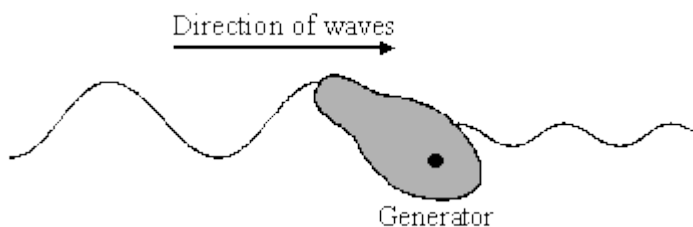
- (b) The diagram shows the direction of the waves across the pool. The waves reflect off the side of the pool.



Draw a line on the diagram to show the direction of the waves after they hit the side of the pool.

(1)

- (c) The swimming pool is used to test a model of an electricity generator. The waves make the floating generator move up and down. This energy is transferred to electricity.



- (i) In the following sentence, cross out the **two** lines that are wrong in the box.

The diagram shows that the amplitude of the waves gets larger
stays the same
gets smaller as the waves pass the generator.

(1)

- (ii) What type of energy does the generator transfer to electricity?

(1)

- (iii) Energy from ocean waves could be used to generate electricity. Would this be a renewable or non-renewable energy resource?

(1)

(Total 7 marks)