AQA GCSE PHYSICS (HIGHER) · 8463

PHYSICS



EXAM QUESTION PACK

4.6.2 ELECTROMAGNETIC WAVES (PACK 4)

SCORE	PERCENTAGE
/59	%

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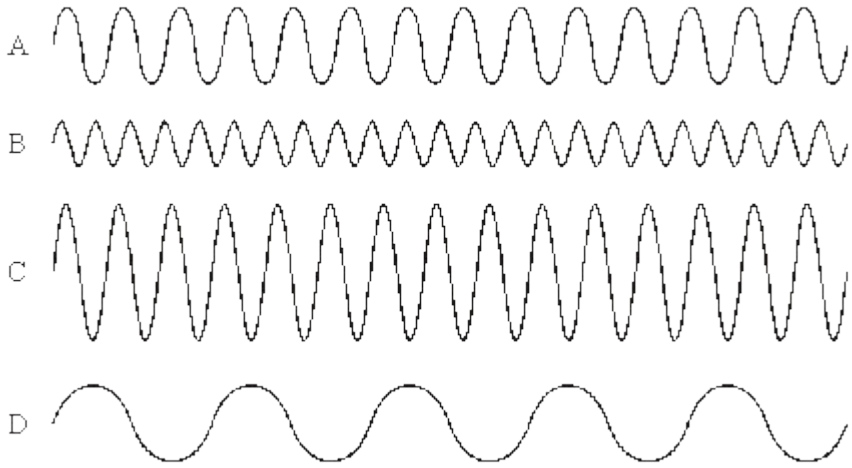
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Q1.

The diagram shows oscilloscope traces of four waves, **A**, **B**, **C** and **D**. All four waves are drawn to the same scale.



Which wave has:

(a) the longest wavelength; _____

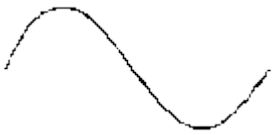
(b) the greatest amplitude; _____

(c) the highest frequency? _____

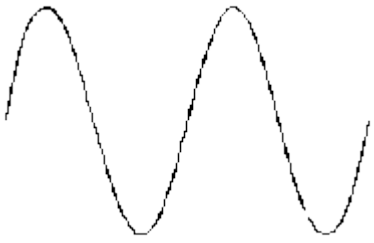
(Total 3 marks)

Q2.

Some students made a small hand-turned a.c. generator, similar to a bicycle dynamo. They connected it to the Y plates of a cathode ray oscilloscope, CRO, and turned the generator slowly. The trace on the CRO looked like this:



They then turned the generator faster and the trace looked like this:



(a) Why did the trace on the CRO show:

(i) an increase in frequency;

_____

(1)

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(ii) a decrease in wavelength;

_____

(1)

(iii) an increase in amplitude?

_____

(1)

(b) One way to alter the output from the generator is to change the speed of turning. State **two** other ways to adapt parts of the generator to increase its output.

_____

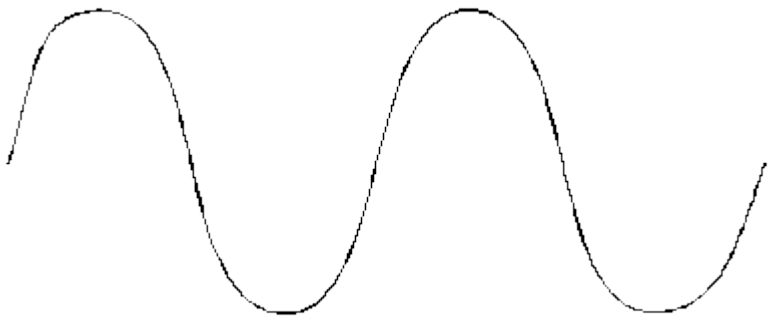
_____

(2)

(Total 5 marks)

Q3.

(a) On the wave drawn below, mark the amplitude and wavelength.



(2)

(b) A wave is said to have a frequency of 25 Hz.

Explain what the term *frequency* means.

_____

_____

_____

(1)

(c) From the electromagnetic spectrum, give the name and use of a radiation of lower frequency than light.

Name _____

Use _____

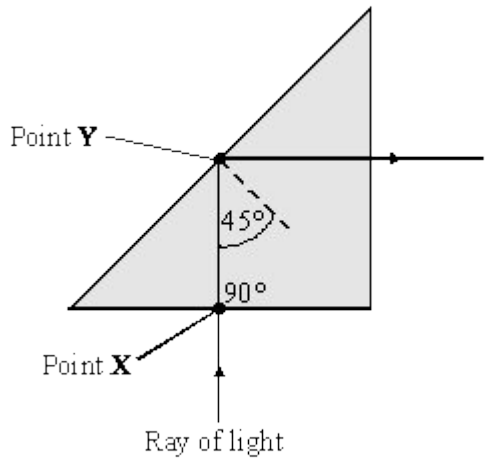
(2)

(Total 5 marks)

Q4.

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The diagram shows a glass prism.



(i) Explain why refraction has **not** occurred at point **X**.

_____

_____

(1)

(ii) (A) Give the full name for the process which has occurred at point **Y**.

_____

(1)

(B) Explain why this process has occurred.

_____

_____

_____

(2)

(Total 4 marks)

Q5.

(i) Use the words frequency, wavelength and wave speed to write an equation which shows the relationship between them.

_____

(1)

(ii) Calculate the speed of a sound wave with a frequency of 250 Hz and a wavelength of 1.3 m.

Show how you get to your answer and give the unit.

_____

_____

Speed = _____

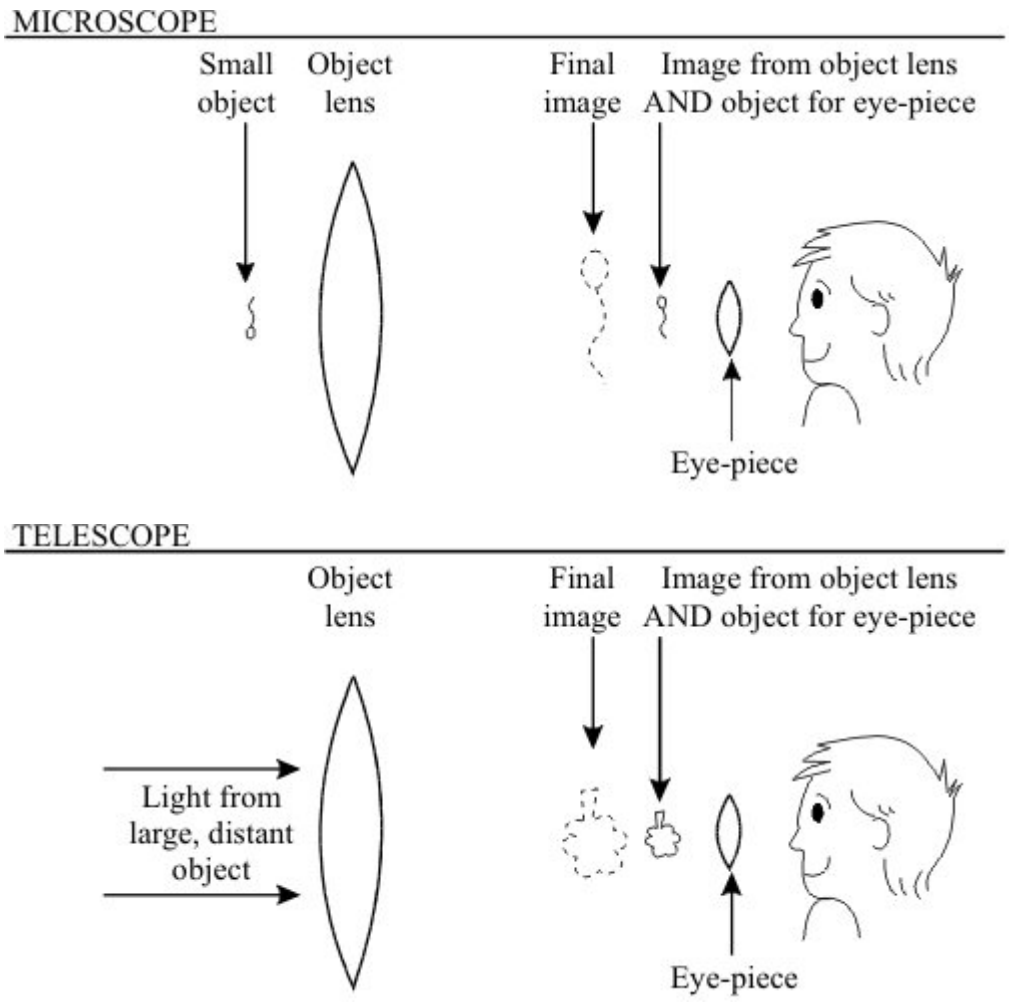
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(2)

(Total 3 marks)

Q6.

The diagrams show how the same two lenses can be used to make a microscope **or** a telescope.



The microscope and the telescope made from the two lenses are similar in some ways but different in others.

Complete the table to show these **similarities** and **differences**.

	Similarities	**Differences**
What the micro-scope and telescope are used for		
The job done by the eye-piece		
How the final image compares with the **original** object		

(Total 7 marks)

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Q7.

Explain fully why pregnant women should not normally have X-rays of the lower body.

_____

_____

_____

_____

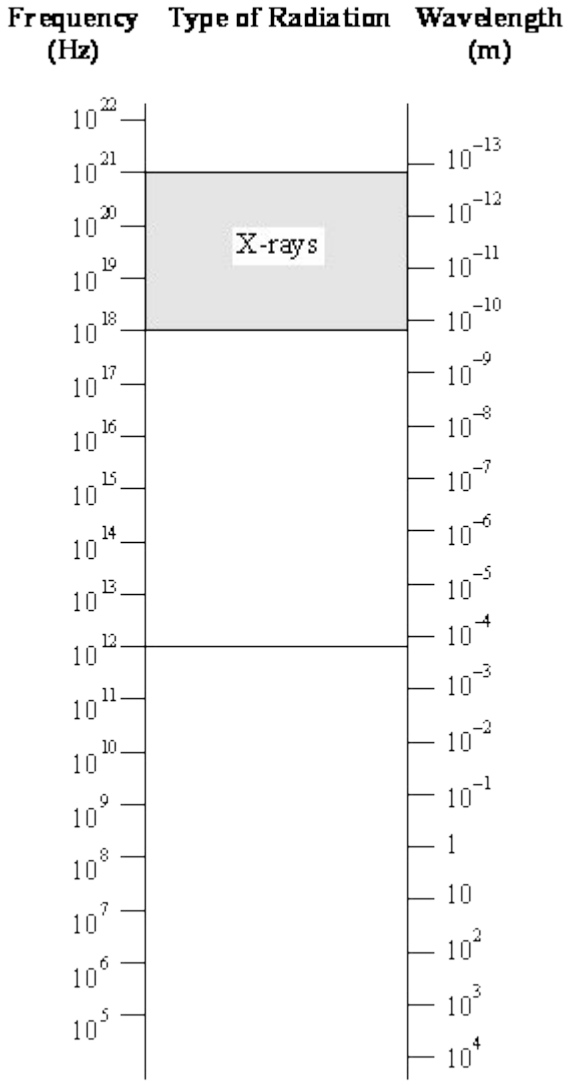
_____

(Total 4 marks)

Q8.

The diagram below shows the range of wavelengths and frequencies for all the types of radiation in the electromagnetic spectrum.

X–rays, which have frequencies in the range 10^{18}–10^{21} Hz are already marked on the diagram.



Complete the diagram by adding the following:

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(a) *gamma* radiation, which has shorter wavelengths than X–rays;

(b) *radio* waves which have wavelengths longer than 0.1m;

(c) the *visible* spectrum which has wavelengths from 400 nm (violet) to 700 nm (red);

(d) *ultraviolet* radiation (i.e. radiation with a higher frequency than violet light);

(e) *microwaves* which have a shorter wavelength than radio waves and *infrared* radiation which has a higher frequency than microwaves;

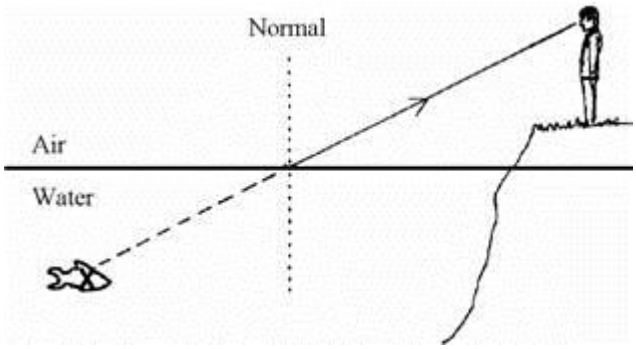
(f) an *FM* radio programme on 92MHz. (Show this with an arrow ®)

(Total 7 marks)

Q9.

A man is walking along the bank of a river.

He sees a fish which seems to be at X.



(a) Show, on the diagram, where the fish **really** is.

Complete the ray of light which goes from the fish into the man's eye.

(2)

(b) Complete the sentence.

The ray of light is _____ as it passes from the water into the air.

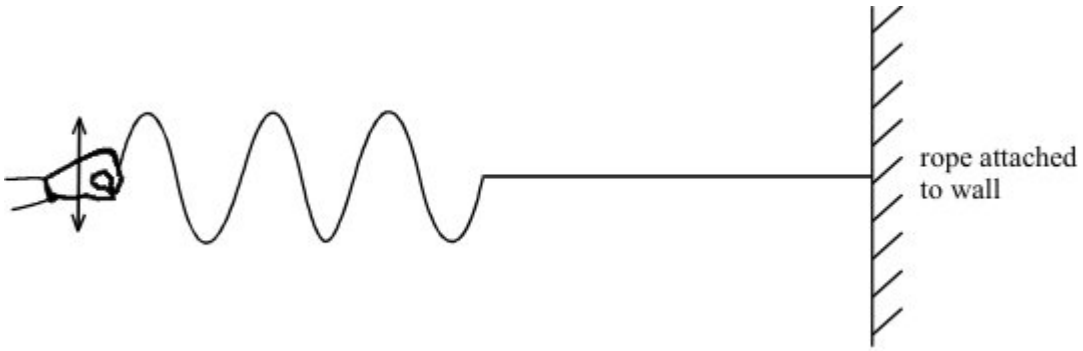
(1)

(Total 3 marks)

Q10.

The diagram shows some waves travelling along a rope.

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(a) Show on the diagram

(i) the wavelength of one of the waves

(2)

(ii) the amplitude of one of the waves

(2)

(b) The waves shown on the diagram were produced in two seconds.

What is the frequency of the waves?

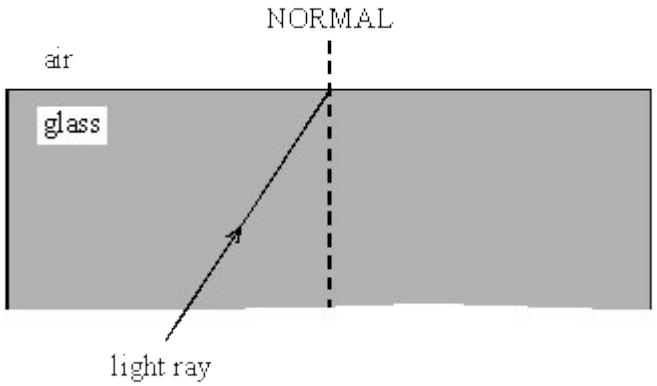
_____

(2)

(Total 6 marks)

Q11.

The diagram shows a ray of light travelling through a glass block.



(a) Complete the diagram to show what happens to the ray of light when it comes out of the glass.

(2)

(b) Explain why this happens to the ray of light.

_____

(2)

(Total 4 marks)

Q12.

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The diagram shows some of the kinds of waves in the electromagnetic spectrum.
Choose words from this list to complete the empty boxes on the diagram.

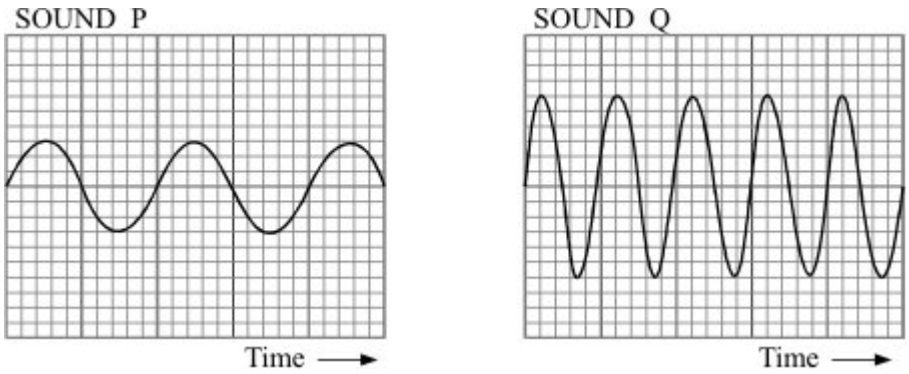
alpha radiation **infrared radiation** **radio waves** **X-rays**

Shortest wavelength						Longest wavelength
gamma radiation		ultraviolet radiation	light		microwaves	

(Total 3 marks)

Q13.

The diagram shows the oscilloscope traces of two different sounds P and Q. The oscilloscope setting is exactly the same in both cases.



P and Q **sound** different.
Write down **two** differences in the way they sound.
Explain your answers as fully as you can.

1. _____

_____

_____

2. _____

_____

_____

(Total 5 marks)

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