

- 1 Use words from the box to complete the sentence.

acceleration	amplitude	frequency	speed	wavelength
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Compared with other regions in the electromagnetic spectrum, radio waves have the largest ..... and the smallest ..... .

[2]

[Total: 2]

- 2 The diagram shows the regions of the electromagnetic spectrum.

radio waves	microwaves	infra-red waves	1	ultraviolet waves	X-rays	2
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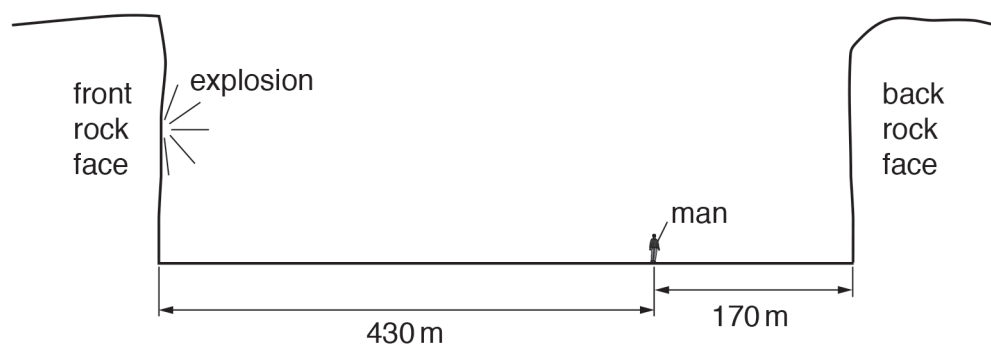
Give the names of the two regions that are labelled 1 and 2.

1. ....

2. .... [2]

[Total: 2]

- 3 The diagram shows the position of a man working in a rock quarry. A single explosion is used to break part of one rock face.



- (a) Explain why the man sees the flash of the explosion before he hears the bang.

.....

..... [1]

- (b) The man hears a second bang shortly after the first bang.

(i) State the name given to this second bang.

..... [1]

(ii) State how the second bang compares with the first bang in terms of its amplitude and speed.

amplitude .....

speed ..... [2]

(c) The man stands 170 m from the back rock face. The time between hearing the first bang and hearing the second bang is 1.0 s.

Use the information in the diagram to determine the speed of sound in the quarry.

speed of sound = ..... m/s [3]

[Total: 7]

4 A student has a mobile (cell) phone. The phone receives a signal from a transmitter and produces a ring tone.

State two differences between the microwave signal received by the phone and the sound wave produced when the phone rings.

1. ....

2. .... [2]

[Total: 2]

5 The figure represents the electromagnetic spectrum.

γ-rays	X-rays	ultra-violet	visible light			radio waves
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Fill in the blank spaces between visible light and radio waves by adding the names of the radiations.

.....

..... [2]

[Total: 2]

6 The figure represents the electromagnetic spectrum.

$\gamma$ -rays	X-rays	ultra-violet	visible light			radio waves
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Describe a common use of X-rays.

.....

..... [1]

[Total: 1]

7 The figure represents the electromagnetic spectrum.

$\gamma$ -rays	X-rays	ultra-violet	visible light			radio waves
----------------	--------	--------------	---------------	--	--	-------------

Identify one feature that is the same for all radiations that form the electromagnetic spectrum.

.....

..... [1]

[Total: 1]

8 The figure represents the electromagnetic spectrum.

$\gamma$ -rays	X-rays	ultra-violet	visible light			radio waves
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State a precaution taken by those who work with X-rays.

.....

..... [1]

[Total: 1]

- 9 The figure represents the electromagnetic spectrum.

$\gamma$ -rays	X-rays	ultra-violet	visible light			radio waves
----------------	--------	--------------	---------------	--	--	-------------

State the radiation that has the shortest wavelength.

..... [1]

[Total: 1]

- 10 Visible light is one region of the electromagnetic spectrum, as represented in the figure.

radio waves	microwaves	infra-red waves	visible light	ultraviolet waves		
long wavelength					short wavelength	

- (a) Two regions of the electromagnetic spectrum are missing from the figure.

State the name of the missing region with the longer wavelength.

..... [1]

- (b) An infra-red sensor is fitted into a room as part of an intruder alarm system.

Explain how the sensor detects a person in the room.

.....  
 ..... [2]

[Total: 3]

- 11 State how the wavelength of violet light in air differs from the wavelength of red light in air.

..... [1]

[Total: 1]

**12** How do infra-red waves differ from ultraviolet waves?

- A** Infra-red waves are longitudinal.
- B** Infra-red waves have a lower speed in a vacuum.
- C** Infra-red waves have lower frequencies.
- D** Infra-red waves have shorter wavelengths.

[1]

[Total: 1]

**13** Infra-red waves, microwaves, radio waves and sound waves are all used for communications.

Which waves travel at the same high speed in a vacuum?

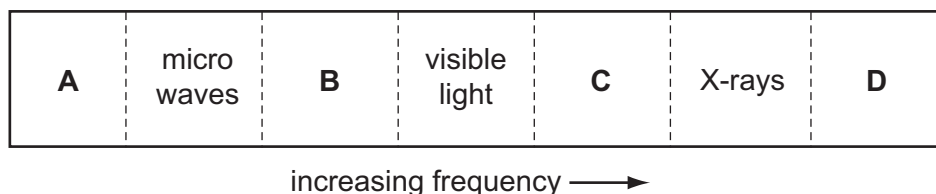
- A** infra-red waves, microwaves and radio waves
- B** infra-red waves, microwaves and sound waves
- C** infra-red waves, radio waves and sound waves
- D** microwaves, radio waves and sound waves

[1]

[Total: 1]

**14** The diagram shows the spectrum of electromagnetic waves.

Which labelled region represents radio waves?



[1]

[Total: 1]

**15** Which type of radiation lies between visible light and microwaves in the electromagnetic spectrum?

- A** infra-red
- B** radio waves
- C** ultra-violet
- D** X-rays

[1]

[Total: 1]