

1 Which row shows the natures of light waves, sound waves and X-rays?

	light waves	sound waves	X-rays
<b>A</b>	longitudinal	longitudinal	transverse
<b>B</b>	longitudinal	transverse	longitudinal
<b>C</b>	transverse	longitudinal	transverse
<b>D</b>	transverse	transverse	longitudinal

2 Visible light has a frequency of approximately  $5.0 \times 10^{14}$  Hz.

M and N are two other types of electromagnetic radiation.

The frequency of M is  $5.0 \times 10^6$  Hz.

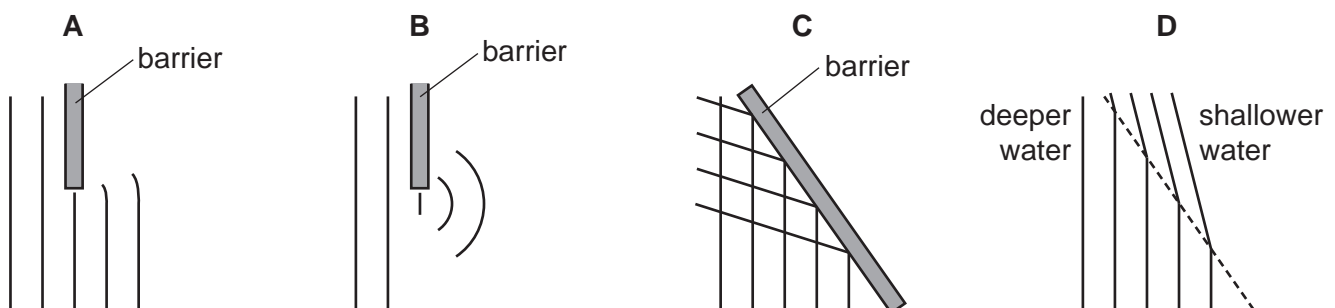
The frequency of N is  $5.0 \times 10^{15}$  Hz.

Which types of radiation are M and N?

	M	N
<b>A</b>	radio waves	infra-red
<b>B</b>	radio waves	ultraviolet
<b>C</b>	ultraviolet	X-rays
<b>D</b>	X-rays	infra-red

3 The diagrams represent water waves in a tank.

Which diagram represents a wave that changes speed?

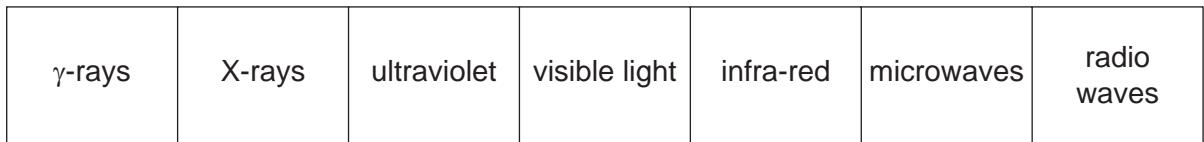


- 4 The diagram represents the electromagnetic spectrum.  
Some regions have been labelled, and some labels are missing.  
Which region should be labelled as infra-red waves?



- 5 Which group contains only electromagnetic waves?
- A light waves, radio waves,  $\gamma$ -rays
  - B light waves, radio waves, sound waves
  - C light waves, sound waves,  $\gamma$ -rays
  - D radio waves, sound waves,  $\gamma$ -rays

- 6 The diagram shows the electromagnetic spectrum.



increasing ..... 

A word is missing from the label below the spectrum.

Which word is missing?

- A amplitude
- B frequency
- C speed
- D wavelength

- 7 How do infra-red waves differ from ultraviolet waves?
- A** Infra-red waves are longitudinal.
  - B** Infra-red waves have a lower speed *in vacuo* (in a vacuum).
  - C** Infra-red waves have lower frequencies.
  - D** Infra-red waves have smaller wavelengths.
- 8 Which list shows electromagnetic waves in order of increasing frequency?
- A** visible light, X-rays,  $\gamma$ -rays
  - B** visible light,  $\gamma$ -rays, X-rays
  - C** X-rays,  $\gamma$ -rays, visible light
  - D**  $\gamma$ -rays, X-rays, visible light
- 9 Which statement about ultraviolet waves is correct?
- A** They are used in television remote controllers.
  - B** They can be detected by the human eye.
  - C** They travel as longitudinal waves.
  - D** They have the same speed in a vacuum as radio waves.
- 10 Which type of electromagnetic wave is used in airport security scanners?
- A** infra-red
  - B** microwaves
  - C** radio waves
  - D** X-rays

11 An intruder alarm sensor detects that a human is warmer than his surroundings.

Which type of electromagnetic wave does the sensor detect?

- A** infra-red
- B** radio
- C** ultraviolet
- D** visible light

12 Different parts of the electromagnetic spectrum are used for different purposes. Below are four statements about parts of the spectrum.

statement 1: Infra-red waves are used in television remote controllers.

statement 2: Radio waves are used to transmit television pictures from satellites to Earth.

statement 3: Ultra-violet waves are used for intruder alarms.

statement 4: X-rays are used for security checks.

Which statements are correct?

- A** 1 and 2      **B** 1 and 4      **C** 2 and 3      **D** 3 and 4

13 Which group of electromagnetic radiations is arranged in order of increasing frequency?

- A** infra-red, visible light, ultraviolet
- B**  $\gamma$ -rays, X-rays, infra-red
- C** ultra-violet, visible light, radio waves
- D** X-rays, radio waves,  $\gamma$ -rays

14 An electronic engineer makes devices which can receive television pictures from satellites.

Which type of electromagnetic radiation must these devices be able to receive?

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

15 The table gives common uses for three types of electromagnetic wave.

Which row correctly identifies the waves?

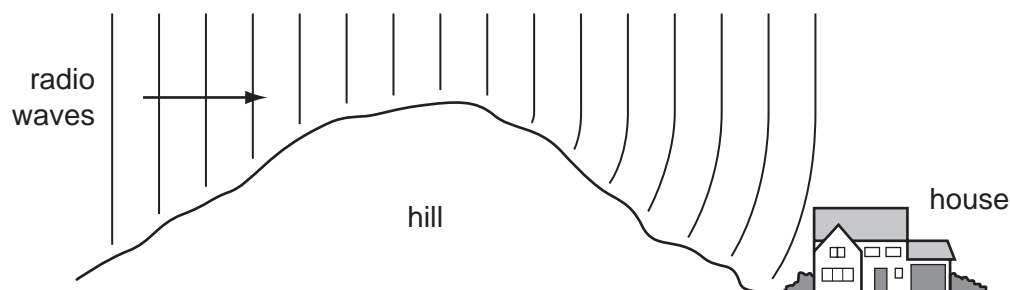
	satellite television	terrestrial television (not satellite)	television remote controllers
<b>A</b>	infra-red waves	microwaves	radio waves
<b>B</b>	microwaves	radio waves	infra-red waves
<b>C</b>	radio waves	infra-red waves	microwaves
<b>D</b>	radio waves	microwaves	infra-red waves

16 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

17 Radio waves are received at a house at the bottom of a hill.



The waves reach the house because the hill has caused them to be

- A diffracted.
- B radiated.
- C reflected.
- D refracted.

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<b>D</b>	X-rays	infra-red