

Electromagnetic Spectrum

Question Paper

Course	CIE IGCSE Physics
Section	3. Waves
Topic	Electromagnetic Spectrum
Difficulty	Hard

Time Allowed 10

Score /5

Percentage /100

Question 1

Extended tier only

Which of the following options shows the correct speed for electromagnetic waves in a vacuum?

- A. $3.0 \times 10^4 \text{ cm/s}$
- B. $3.0 \times 10^8 \text{ cm/s}$
- C. $3.0 \times 10^{10} \text{ cm/s}$
- D. $3.0 \times 10^8 \text{ km/s}$

[1 mark]

Question 2

Extended tier only

Mobile phone networks rely on electromagnetic radiation to transmit signals.

Which of the following statements is correct?

- A. Radio waves are used for mobile networks because they travel over long distances and easily penetrate walls
- B. Microwaves are used for mobile networks because they can operate with a short aerial and easily penetrate walls
- C. Infrared waves are used for mobile networks because they travel over long distances and are not damaging to soft tissue
- D. Ultrasound waves are used for mobile networks because they can travel to the satellites in space

[1 mark]

Question 3

Extended tier only

Bluetooth devices rely on electromagnetic radiation to transmit signals.

Which of the following statements is correct?

- A. Visible light is used by Bluetooth-enabled devices because it undergoes total internal reflection in optical fibres
- B. Gamma waves are used by Bluetooth-enabled devices because they penetrate easily through walls
- C. Microwaves are used by Bluetooth-enabled devices because they can reach satellites in orbit as they are not absorbed by the ionosphere
- D. Radio waves are used by Bluetooth-enabled devices because they transmit very well over short distances

[1 mark]

Question 4

Which line in the table correctly identifies a use and a danger of the electromagnetic wave given in the first column?

	EM wave	Uses	Dangers
A.	gamma	detection of cancers	internal heating of body cells
B.	x-rays	detecting false bank notes	mutation or damage to body cells
C.	visible	photography	mutation or damage to body cells
D.	infrared	thermal imaging	skin burns

[1 mark]

Question 5**Extended tier only**

Communications engineers need to choose whether to send signals as either digital or analogue.

What is the main benefit of using digital signals?

- A.** The sound is heard more loudly
- B.** The signal may not always be clean
- C.** Signals do not need to be converted, saving time
- D.** Signals are clearer and travel more quickly

[1 mark]