Unit 7: Waves:

Subunit 7.4: Electromagnetic spectrum:

Topical Question No: 1

26 M and N are two electromagnetic waves.

The ratio

$$\frac{\text{wavelength of M}}{\text{wavelength of N}} = 10^5.$$

What could M and N be?

	M	N
A	microwaves	visible light
B	microwaves	γ-rays
C	γ-rays	microwaves
D	visible light	microwaves

Topical Question No: 2

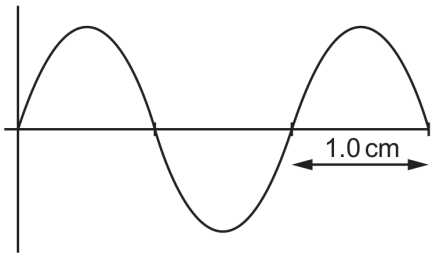
23 The table lists possible orders of magnitude of the wavelengths of some of the principal radiations of the electromagnetic spectrum.

Which row shows the correct orders of magnitude of the wavelengths?

	wavelength / m			
	microwaves	infra-red	ultraviolet	X-rays
A	10^{-6}	10^{-10}	10^{-12}	10^{-14}
B	10^{-4}	10^{-8}	10^{-10}	10^{-12}
C	10^{-2}	10^{-6}	10^{-8}	10^{-10}
D	10^{2}	10^{-4}	10^{-6}	10^{-8}

Topical Question No: 3

25 The diagram shows a cathode-ray oscilloscope display of an electromagnetic wave.



The time base setting is $0.20\,\mu s\,cm^{-1}$.

Which statement is correct?

A The frequency of the wave is 2.5 MHz and it lies in the microwave region of the electromagnetic spectrum.

B The frequency of the wave is 2.5 MHz and it lies in the radio-wave region of the electromagnetic spectrum.

C The frequency of the wave is 5.0 MHz and it lies in the microwave region of the electromagnetic spectrum.

D The frequency of the wave is 5.0 MHz and it lies in the radio-wave region of the electromagnetic spectrum.

Topical Question No: 4

25 What is **not** a possible value for the wavelength of the named electromagnetic waves when it is travelling in a vacuum?

	electromagnetic wave	wavelength / m
A	γ-rays	3×10^{-13}
B	X-rays	3×10^{-10}
C	infrared	3×10^{-6}
D	microwaves	3×10^{-5}

Topical Question No: 5

23 What is the approximate range of frequencies of electromagnetic radiation visible to the human eye?

A (430–750) kHz

B (430–750) MHz

C (430–750) GHz

D (430–750) THz

Topical Question No: 6

27 A transmitting mast sends out microwaves of wavelength 1.5 cm and radio waves of wavelength 1.5 km.

Topical Question No: 7

22 Which statement about different types of electromagnetic wave is correct?

A The frequency of infra-red waves is less than the frequency of blue light.

B The frequency of radio waves is greater than the frequency of gamma rays.

C The wavelength of red light is less than the wavelength of ultraviolet waves.

D The wavelength of X-rays is greater than the wavelength of microwaves.

Topical Question No: 8

5 Radio waves can be used to measure the distance between Earth and the planet Jupiter.

A pulse of radio waves is emitted from the surface of Earth. The pulse reflects from the surface of Jupiter and is detected again on Earth.

The time between emitting and receiving the pulse is 3960 s.

What is the distance between Earth and Jupiter?

A 5.94×10^{8} km

B 1.19×10^{9} km

C 5.94×10^{11} km

D 1.19×10^{12} km

Topical Question No: 9

26 Which statement about waves is correct?

A All electromagnetic waves travel at the same speed in a vacuum.

B Longitudinal waves can be polarised.

C The amplitude of a wave is directly proportional to the energy transferred by the wave.

D The frequency of infra-red light is greater than the frequency of ultra-violet light.

Space for working

Answer Key

1. N/A
2. N/A
3. N/A
4. D
5. D
6. B
7. N/A
8. A
9. N/A