

Radio waves to gamma rays: uses and risks

Physics grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · Test

Name: _____ Date: _____ Class: _____ Mark: ____ / 20

This test covers the order of the spectrum, the wave equation, uses of the waves and ionising radiation. Show your working and give units. The paper is worth 20 marks.

Level: Physics grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · **Curriculum:** HS-PS4-4, HS-PS4-5

Time: 45 minutes · 8 questions · Total: 20 marks · Calculator allowed

Question 1 Order (2 marks)

Write the seven regions of the electromagnetic spectrum in order of increasing wavelength, starting with the shortest. (2 marks)

Question 2 Radio wavelength (3 marks)

- State the speed of electromagnetic waves in a vacuum. (1 mark)
- An AM radio station broadcasts at 1.20×10^6 Hz. Calculate its wavelength. (2 marks)

Question 3 Choosing waves (2 marks)

Give one use for infrared and one use for X-rays, and state a property that makes each wave suitable. (2 marks)

Question 4 Ionising radiation (3 marks)

- Explain what is meant by ionising radiation. (1 mark)
- Name two types of electromagnetic wave that are ionising. (1 mark)
- State one harmful effect on a person. (1 mark)

Question 5 Ultraviolet damage (3 marks)

Explain why a farmer working in the sun is at greater risk from ultraviolet than from visible light, and describe two ways to reduce the risk. (3 marks)

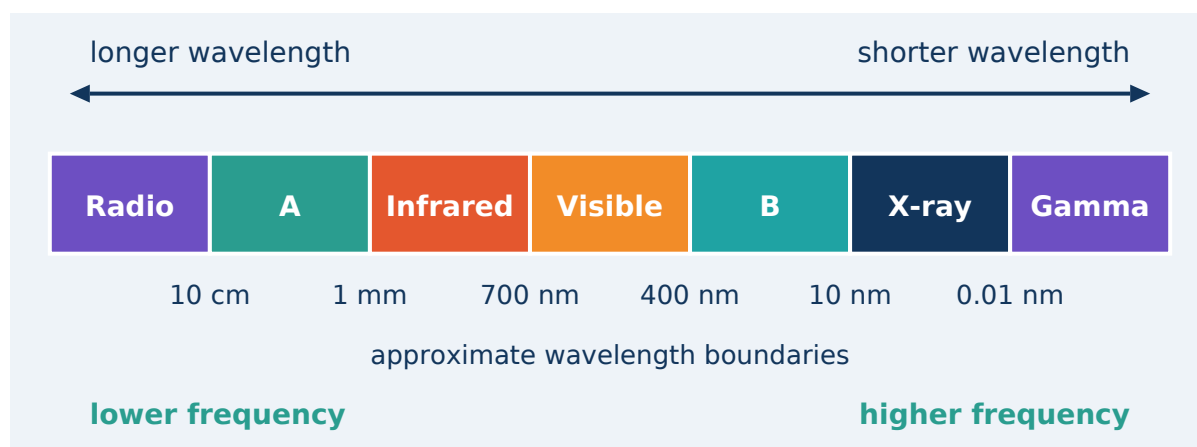
Question 6 Weather radar (2 marks)

A radar pulse reflects from a storm cloud and returns after 4.0×10^{-5} s. Calculate the distance to the cloud. (2 marks)

Question 7 Missing regions (2 marks)

The diagram shows the electromagnetic spectrum with two regions missing.

- Name the region marked A and the region marked B. (1 mark)
- State which region has the highest frequency. (1 mark)



Regions A and B are not named.

Question 8 Phones and X-rays (3 marks)

Explain why the microwaves from a mobile phone are non-ionising while X-rays are ionising. (3 marks)