# End of chapter quiz

# Chapter P1: Radiation and waves

## Instructions and answers for teachers

These instructions cover the learner activity section which can be found on [page 8](#_Chapter_P1:_Radiation). This end of chapter quiz supports OCR GCSE (9–1) Physics B (J259), Chapter P1.

**When distributing the activity section to the learners either as a printed copy or as a Word file you will need to remove the teacher instructions section.**

### The Activity

This end of chapter quiz is a teaching and learning resource comprised of 40 marks covering a range of question types. The quiz starts with some multiple choice questions (MCQs) and then moves on to some short answer questions and then finally on to some longer answer questions.

This resource can be used to test and consolidate understanding at the end of teaching the chapter or to revisit and refresh knowledge at a later point in the course.

### Learning Outcomes

This end of chapter quiz relates to the specification learning outcomes in Chapter P1: Radiation and waves. The questions in this quiz cover a range of the following topics:

P1.1 What are the risks and benefits of using radiation?

P1.2 What is climate change and what is the evidence for it?

P1.3 How do waves behave?

P1.4 What happens when light and sound meet different materials?

### Chapter: P1 of J259 - Answers

**Total marks: 40**

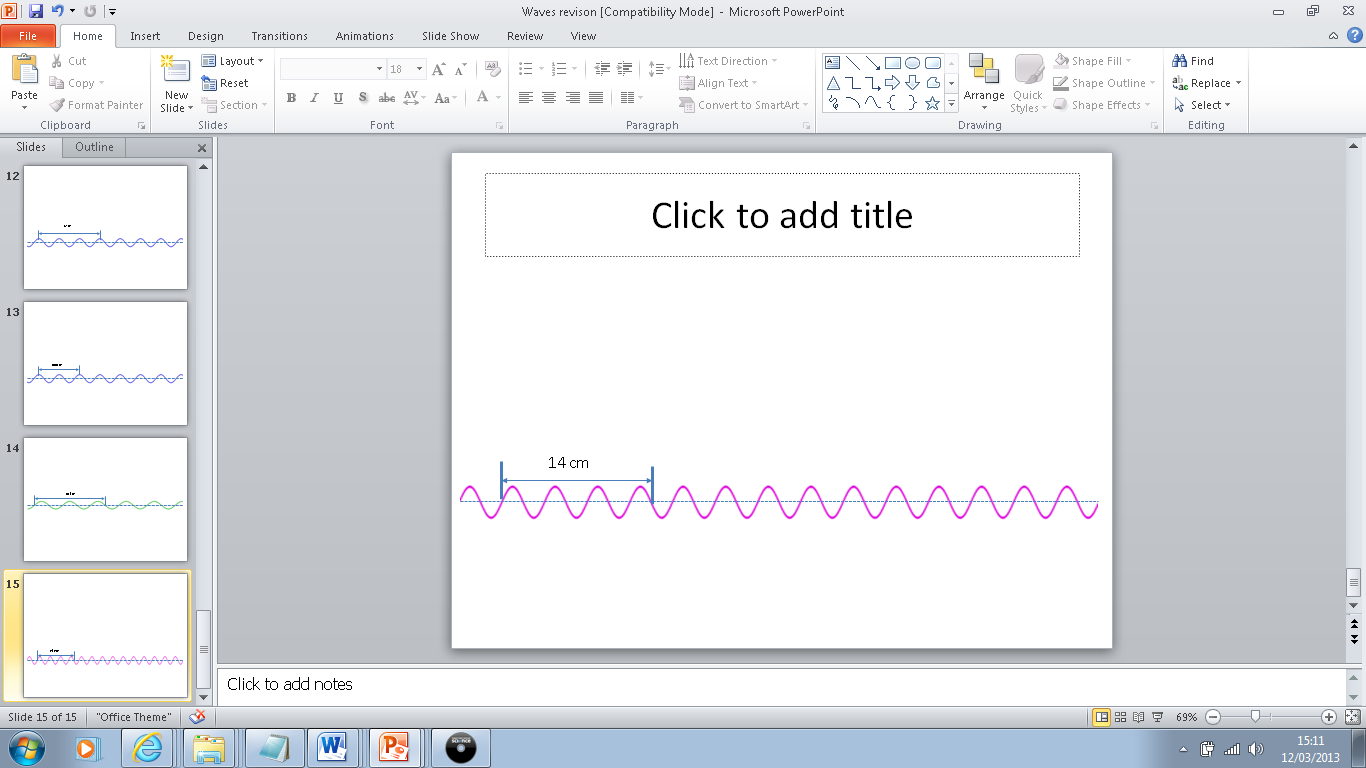
1. The speed of a sound wave is 340 m/s. The wavelength of the sound wave is 5 cm. What is the frequency of the sound wave? **[1 mark]**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **A** |  | 68 Hz |  |
|  | **B** |  | 6800 Hz |  |
|  | **C** |  | 1700 Hz |  |
|  | **D** |  | 0.015Hz |  |
|  |  |  |  |  |

Your answer

**B**

1. What is the wavelength of the following wave? **[1 mark]**



|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | |  | | Diagram shows the length of 3 ½ wavelengths to be 14 cm.  14 cm ÷ 3.5 = 4 cm ✓ |  |
|  | |  | | | |

1. The diagram below shows the electromagnetic spectrum.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Radio | **A** | **B** | Visible | **C** | **D** | Gamma |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **(a)** |  | Write the correct name for the missing parts of the EM spectrum. **[4 marks]** |  |
|  | **A** |  | Microwave ✓ |  |
|  | **B** |  | Infrared ✓ |  |
|  | **C** |  | Ultraviolet ✓ |  |
|  | **D** |  | X-rays ✓ |  |
|  |  |  |  |  |
|  | **(b)** |  | Which of the above EM waves are ionizing? **[3 marks]** |  |
|  |  |  | Ultraviolet ✓  X-ray ✓  Gamma ✓ |  |
|  |  |  |  |  |
|  | **(c)** |  | Which of the above EM waves is most likely to cause damage to DNA?  **[1 mark]** |  |
|  |  |  | Gamma ✓ |  |
|  |  |  |  |  |
| **4.** | **(a)** | **(i)** | Nicky is looking into a specialised mirror which has lights around the edges. Explain how Nicky can see her reflection in the mirror by describing the path of light. **[4 marks]** |  |
|  |  |  | Girl looking in mirror |  |
|  |  |  | Light is **emitted** from the bulb. ✓  Light is **reflected** off the girl’s face. ✓  Light is **reflected** from the mirror. ✓  Light is **absorbed** by the girl’s eye, ✓ |  |
|  |  |  |  |  |
|  | **(b)** |  | Nicole is at a concert; however she is at the back and is finding it hard to video her favourite star as there are many people in the way. Nicole uses a simple periscope attached to her phone which allows her to video the star.  Draw a detailed ray diagram showing the incident and reflected rays in the periscope, highlighting the angles of incidence and angles of reflection.  **[2 marks]** |  |
|  |  |  |  |  |
|  |  |  | incident and reflected rays at 90 degrees ✓  Periscope diagram showing direction of light travelnormal showing angle or incidence = angle of reflection ✓ |  |
|  |  |  |  |  |
| **5.** | **(a)** |  | Describe what happens to an atom when it is ionised. **[2 marks]** |  |
|  |  |  | Electron absorbs energy and is removed from the atom ✓  Atom forms an ion ✓ |  |
|  |  |  |  |  |
|  | **(b)** |  | Which of the ionising EM waves is the least ionising? **[1 mark]** |  |
|  |  |  | UV ✓ |  |
|  |  |  |  |  |
|  | **(c)** |  | State one danger of UV radiation. **[1 mark]** |  |
|  |  |  | Any of the following  Skin cancer/ cataracts ✓ |  |
|  |  |  |  |  |

1. The natural greenhouse effect ensures that the Earth’s average temperature stays around 15C.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **(a)** |  | State what would happen to the Earth’s temperature if there were less greenhouse gases than normal? **[1 mark]** |  | |
|  |  |  | The temperature would decrease ✓ |  | |
|  |  |  |  |  | |
|  | **(b)** |  | What type of radiation contributes to the greenhouse effect? **[1 mark]** |  | |
|  |  |  | Infrared ✓ |  | |
|  |  |  |  |  | |
|  | **(c)** |  | Explain how Earth’s atmosphere traps heat. **[3 marks]** |  | |
|  |  |  | Infrared is transmitted through the atmosphere and is absorbed by Earth’s surface ✓  Surface re-emits infrared at a lower wavelength back into the atmosphere. ✓  Some greenhouse gases absorb the lower wavelength infrared (heating atmosphere) and re-emitting infrared back to the Earth’s surface (heating Earth’s surface) ✓ |  | |
|  |  |  |  |  | |
| **7.** | **(a)** |  | What is refraction? Give an example. **[2 marks]** | |  | |
|  |  |  | The change of direction of a wave ✓  when the have passes between two substances with different densities, examples include air/water, cold air/warm air ✓ | |  | |
|  |  |  |  | |  | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **(b)** |  | Complete the ray diagrams for the following lenses**[4 marks]** |  |
|  |  |  | Lense  ✓✓ |  |
|  |  |  | Lense  ✓✓ |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **8.** | **(a)** |  | Sound is a longitudinal wave. State another example of a longitudinal wave. **[1 mark]** | |  | |
|  |  |  | P-waves ✓ | |  | |
|  |  |  |  | |  | |
|  | **(b)** |  | Sound wave showing compressions and refractionsLabel the compressions and rarefactions on the following sound wave.  **[1 mark]** | |  | |
|  |  |  |  | |  | |
|  |  |  |  | |  | |
|  | **(c)** |  | The speed of the above sound is 340 m/s. What is the frequency of the sound wave? **[2 marks]** | |  | |
|  |  |  | Wavelength from diagram = 4 cm ✓  Frequency = 340 ÷ 4 = 85 Hz ✓ | |  | |
| **9.** | **(a)** | **(i)** | | A pupil stands 300 m away from the outside wall of a sport’s hall on a football pitch and bangs a drum. He hears an echo a short time later. The pupil then bangs the drum continuously and adjusts his drumming speed until his bangs coincides with the echo from the proceeding bang. He records the time between each bang which is 1.8 s.  Explain why he hears an echo. **[1 mark]** | |  | |
|  |  |  | | He hears an echo because the sound wave reflects of the wall.✓ | |  | |
|  |  |  | |  | |  | |
|  |  | **(ii)** | | The pupil moves to another smaller field which is surrounded by buildings. How will this affect his data? **[1 mark]** | |  | |
|  |  |  | | Any of the following: ✓  Multiple reflections making it harder to record the time.  Shorter distances means timings will be less accurate  Possible interference between sound waves (superposition) | |  | |
|  |  |  | |  | |  | |
|  | **(b)** | **(i)** | | Using data from question 9a, calculate the speed of sound. **[2 marks]** | |  | |
|  |  |  | | calculating the distance the sound wave travels  300 x 2 = 600 m ✓  calculating the speed of sound  600 m ÷ 1.8 s = 333 m/s ✓ | |  | |
|  |  |  | |  | |  | |
|  |  | **(ii)** | | The speed of sound is 340 m/s at 20°C. Looking at your answer to b(i) do you think it’s a cold or warm day? **[1 mark]** | |  | |
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# End of chapter quiz

# Chapter P1: Radiation and waves

## Learner Activity

### Chapter: P1 of J259

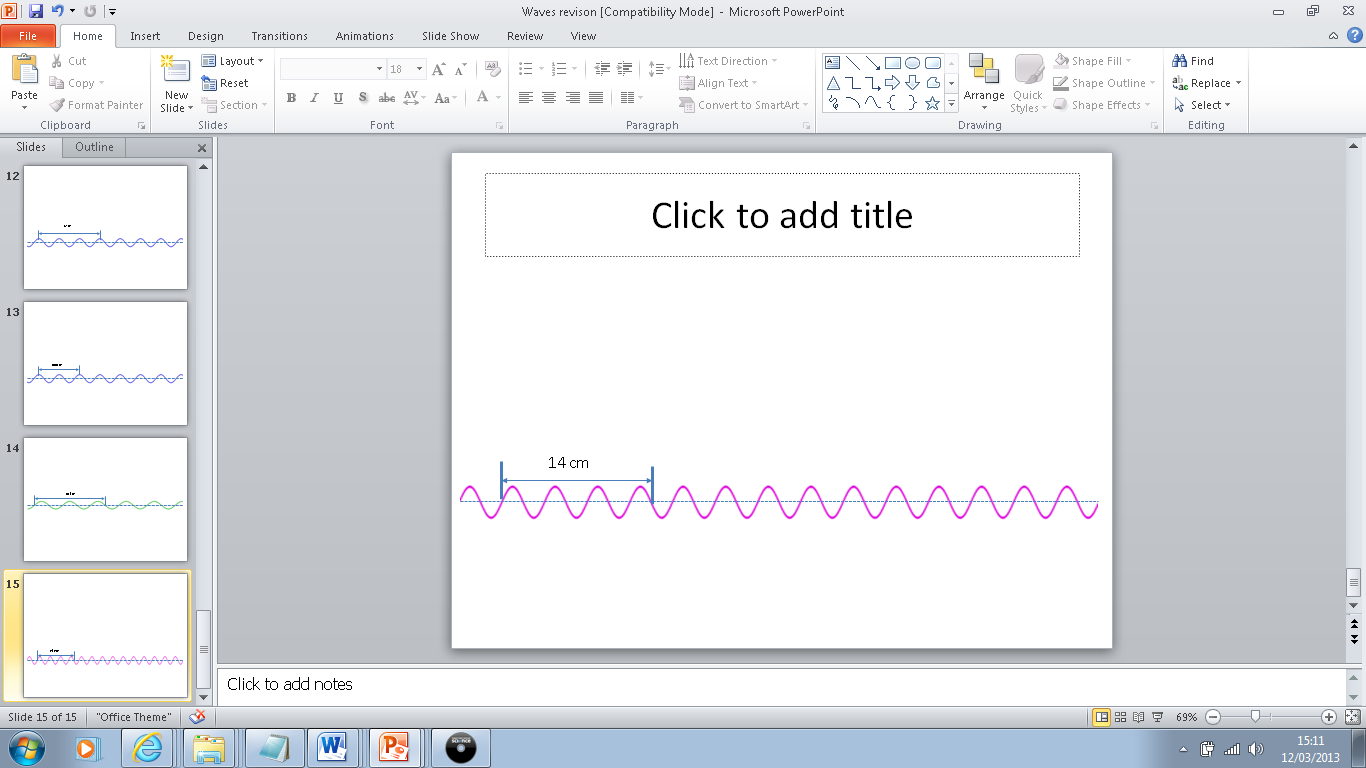
**Total marks: 40**

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Your answer

1. What is the wavelength of the following wave? **[1 mark]**



|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

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|  |  |  | Lense | |  | |
|  |  |  | Lense | |  | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
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