Waves

Physics Paper 2 | 5 questions, 6 marks each

GCSE science 6-mark questions

This topic online

Name: _____ **Date:** _____ **Score:** _____ **/ 30**

Plan before you write: jot down the 6 or more ideas you need, then put them in a sensible order. For compare questions give both sides of each point; for evaluate questions use the information and finish with a conclusion.

1 Amira and Callum stretch a long, loose spring (a slinky) along a smooth floor. First Amira moves her end quickly from side to side. Then she pushes and pulls her end backwards and forwards along the length of the spring.

Compare the two waves made in the spring. In your answer refer to the direction of the oscillations, what the waves look like and real examples of each type.

(6 marks)

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2 **Higher tier**

A ray of light travels through air and enters a rectangular glass block at an angle to the normal. Inside the block the ray bends towards the normal. When the ray leaves the far side of the block it bends away from the normal again.

Explain why the light changes direction at each surface. Use ideas about wave speed and wave fronts in your answer.

(6 marks)

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3 A factory packs frozen vegetables into sealed plastic bags. The manager wants to use electromagnetic waves to do two jobs: kill bacteria on the conveyor belt surfaces, and check inside sealed boxes for metal fragments. The table gives some information.

Wave	What it passes through	Effect on living cells
Infrared	Air; absorbed by most surfaces	Heating only
Ultraviolet	Air; absorbed at surfaces	Damages DNA in bacteria and skin cells; can cause skin cancer and eye damage
X-rays	Plastic and food; mostly absorbed by metal	Ionising; can cause mutations and cancer

Evaluate which waves should be used for each job. Include any safety precautions needed for workers.

(6 marks)

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4 Railway engineers use ultrasound to find hidden cracks inside steel rails. A probe on top of the rail sends short pulses of ultrasound down into the steel and detects any echoes that come back.

Describe how ultrasound can be used to find a crack and work out how deep it is below the top of the rail.

Separate science only

(6 marks)

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5 After a large earthquake, seismometers all around the world record the waves that arrive. P-waves are detected at almost every station, but there is a band of stations, on the far side of the Earth from the earthquake, where no P-waves arrive. S-waves are not detected at any station on the far side of the Earth.

Explain what these observations tell scientists about the structure of the Earth.

Separate science only

(6 marks)

End of questions | Total 30 marks

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