OCR GCSE GATEWAY PHYSICS A · J249

PHYSICS



EXAM QUESTION PACK

M5 GEOMETRY AND TRIGONOMETRY

SCORE	PERCENTAGE
/16	%

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Gateway Physics A (9-1)

Maths 5: Geometry and trigonometry

Please note that you may see slight differences between this paper and the original.

Candidates answer on the Question paper.

OCR supplied materials:
Additional resources may be supplied with this paper.

Other materials required:
- Pencil
- Ruler (cm/mm)

Duration: Not set

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions, unless your teacher tells you otherwise.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Where space is provided below the question, please write your answer there.
- You may use additional paper, or a specific Answer sheet if one is provided, but you must clearly show your candidate number, centre number and question number(s).

INFORMATION FOR CANDIDATES

- The quality of written communication is assessed in questions marked with either a pencil or an asterisk. In History and Geography a *Quality of extended response* question is marked with an asterisk, while a pencil is used for questions in which *Spelling, punctuation and grammar and the use of specialist terminology* is assessed.
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **16**.
- The total number of marks may take into account some 'either/or' question choices.

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1 Look at the table showing information about the electromagnetic spectrum.

Radio	Micro-wave	Infra-red	Visible light	Ultra-violet	X-rays	Gamma-rays
3 MHz	30 GHz	3 THz		3000 THz	3 000 000 THz	300 000 000 THz
100 m	1 cm	100 μm				

The speed of all electromagnetic radiation is 3×10^8 m/s.

(i) Use data in the table to show that the speed of microwaves is 3×10^8 m/s.

[2]

(ii) Ultra-violet waves typically have a frequency of 3000 THz.

Calculate the wavelength of these ultra-violet waves in nm.

Answer = ---------- nm **[3]**

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2 A radio wave has a wavelength of 100 m. It has a speed of 3×10^8 m/s.

Use the equation: Wave speed = Frequency × Wavelength

Calculate the frequency of the wave.

A 3 MHz

B 30 MHz

C 300 MHz

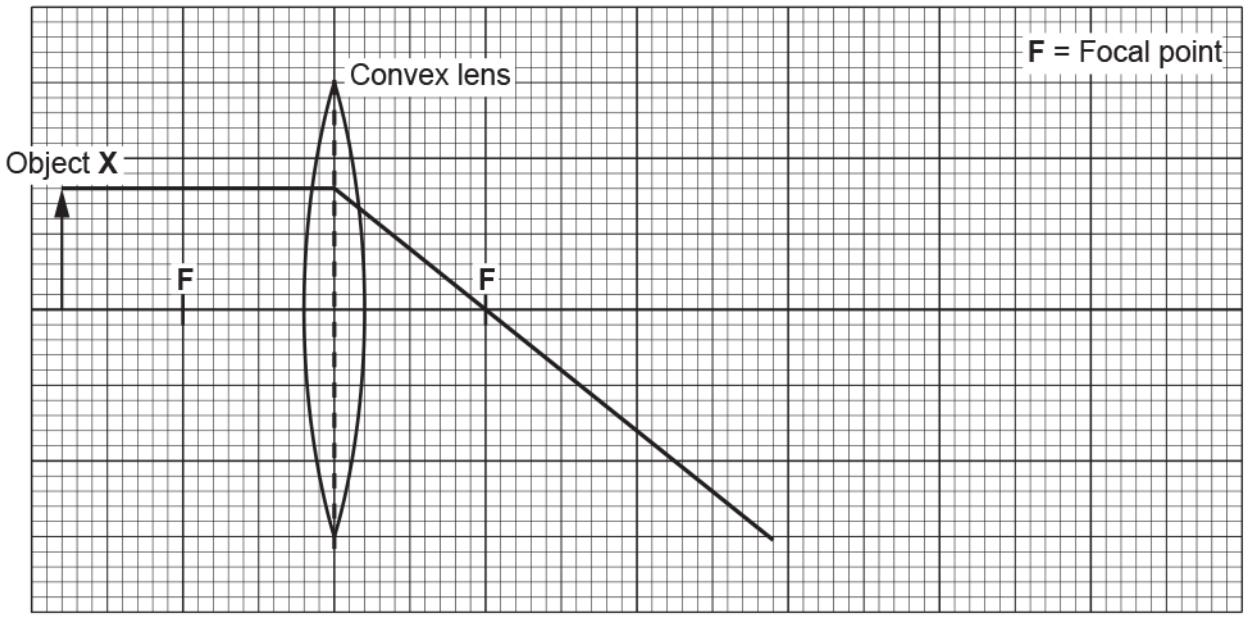
D 3000 MHz

Your answer ☐ [1]

3 A projector is used to create a larger image of an object.

The diagram shows one light ray as it passes through the convex lens.

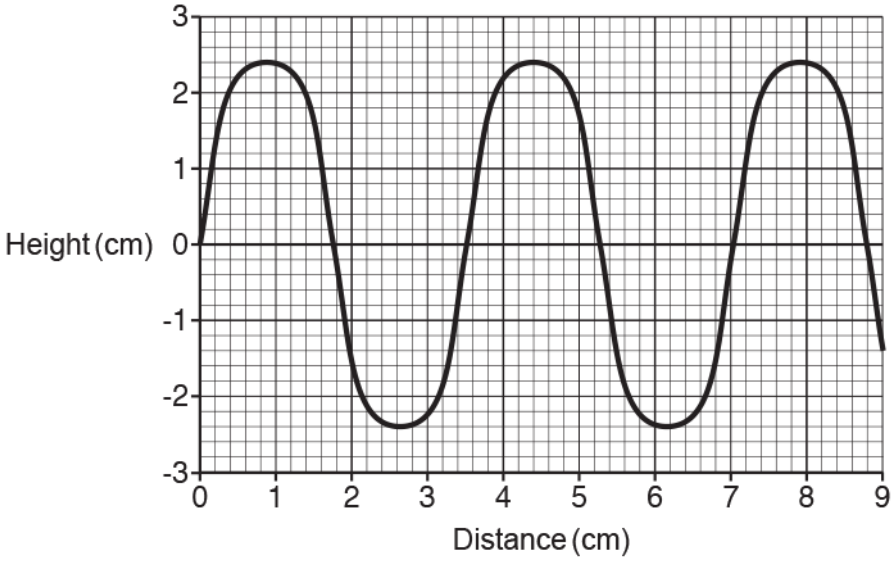
Draw **one** more ray on the diagram to show where the image is formed. Label the image **Y**.



[2]

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4 Look at the diagram of a water wave.



(i) What is the **wavelength** of this wave?

Answer = _____ cm **[1]**

(ii) What is the **amplitude** of this wave?

Answer = _____ cm **[1]**

(iii) The wavelength of the wave is changed to 25 cm. Two waves are produced each second.

Use the equation: Wave speed = Frequency × Wavelength

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Calculate the speed of the wave.

Answer = ---------- m/s **[2]**

5 A student uses a ruler to determine the volume of a cube, **A**. The length of one side of the cube is 0.100 m.

(i) Calculate the volume of cube **A**.

Volume of cube **A** = ... m^3 **[2]**

(ii) Cube **B** has the same volume as cube **A**.

The mass of cube **B** is ten times greater than the mass of cube **A**.

Compare the density of cube **B** with cube **A**.

Use the equation for density to help your explanation.

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[2]

END OF QUESTION PAPER

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