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School code

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School name

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Given name/s

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Family name

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Attach your  
barcode ID label here

Book

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of

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books used

External assessment 2023

Question and response book

# Physics

## Paper 1

### Time allowed

- Perusal time — 10 minutes
- Working time — 90 minutes

### General instructions

- Answer all questions in this question and response book.
- QCAA-approved calculator permitted.
- QCAA formula and data book provided.
- Planning paper will not be marked.

### Section 1 (20 marks)

- 20 multiple choice questions

### Section 2 (26 marks)

- 8 short response questions



**DO NOT WRITE ON THIS PAGE**  
**THIS PAGE WILL NOT BE MARKED**

# Section 1

## Instructions

- This section has 20 questions and is worth 20 marks.
- Use a 2B pencil to fill in the A, B, C or D answer bubble completely.
- Choose the best answer for Questions 1–20.
- If you change your mind or make a mistake, use an eraser to remove your response and fill in the new answer bubble completely.

	A	B	C	D
Example:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	A	B	C	D
1.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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6.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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12.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ensure you have filled an answer bubble for each question.

Do not write outside this box.

## Section 2

### Instructions

- Write using black or blue pen.
  - Marks will not be deducted for correct answers that use different units or a different number of significant figures/decimal places than those indicated in the response box.
  - If you need more space for a response, use the additional pages at the back of this book.
    - On the additional pages, write the question number you are responding to.
    - Cancel any incorrect response by ruling a single diagonal line through your work.
    - Write the page number of your alternative/additional response, i.e. See page ...
    - If you do not do this, your original response will be marked.
  - This section has eight questions and is worth 26 marks.
- 

**DO NOT WRITE ON THIS PAGE**

**THIS PAGE WILL NOT BE MARKED**

Do not write outside this box.



**QUESTION 22 (3 marks)**

Particles move at a rate of  $1.3 \times 10^6$  times per second around a circular particle accelerator with a radius of 35 m.

Calculate the average speed of the particles. Show your working.

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Average speed = \_\_\_\_\_  $\text{m s}^{-1}$  (to two significant figures)

**QUESTION 23 (1 mark)**

List the forces that can be experienced by leptons.

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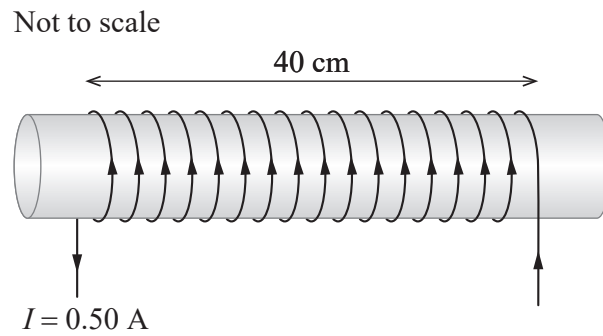
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**QUESTION 24 (4 marks)**

A solenoid consisting of 1240 turns is shown.



Determine the magnitude and direction of the magnetic field inside the solenoid. Show your working.

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Magnitude = \_\_\_\_\_ T (to two significant figures)

Direction = \_\_\_\_\_

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**QUESTION 25 (3 marks)**

An observer who is stationary relative to a moving spaceship measures the velocity of the spaceship to be  $2.0 \times 10^8 \text{ m s}^{-1}$ .

Calculate the length of the spaceship if the observer records it as 18 m. Show your working.

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Length = \_\_\_\_\_ m (to two significant figures)

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**QUESTION 26 (4 marks)**

Calculate the energy (in electron volts) of a photon with a wavelength of 405 nm. Show your working.

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Energy = \_\_\_\_\_ eV (to three significant figures)

Do not write outside this box.















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