A

Surname _____

Forename(s) _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

I declare this is my own work.

Level 3 Certificate/Extended Certificate

APPLIED SCIENCE

Unit 1 Key Concepts in Science

Section C – Physics

ASC1/P

Tuesday 17 January 2023 Morning

At the top of the page, write your surname and forename(s), your centre number, your candidate number and add your signature.

[Turn over]

JAN23ASC1P01

Time allowed: 1 hour 30 minutes. You are advised to spend approximately 30 minutes on this section.

MATERIALS

For this paper you must have:

- **a calculator**
- **the Formulae Sheet (enclosed).**

INSTRUCTIONS

- **Use black ink or black ball-point pen.**
- **Answer ALL questions in each section.**
- **You must answer the questions in the spaces provided. Do not write on blank pages.**
- **If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).**

- **Do all rough work in this book. Cross through any work you do not want to be marked.**

INFORMATION

- **You will be provided with a copy of the Formulae Sheet.**
- **There are three sections in this paper:**
  SECTION A – Biology
  SECTION B – Chemistry
  SECTION C – Physics.
- **The marks for questions are shown in brackets.**
- **The maximum mark for this paper is 60 and the maximum mark for this section is 20.**

ADVICE

Read each question carefully.

DO NOT TURN OVER UNTIL TOLD TO DO SO

SECTION C – PHYSICS

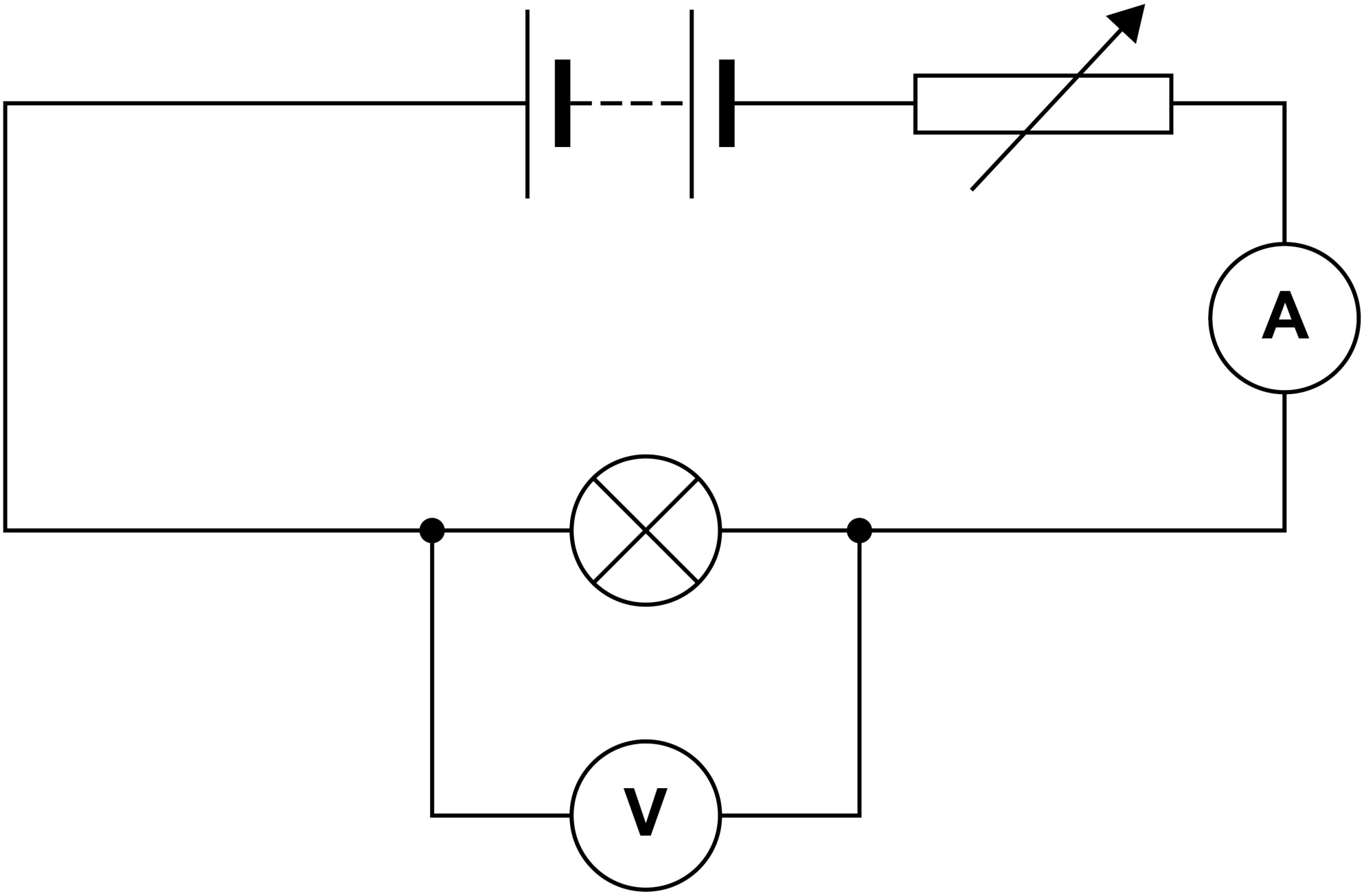
Answer ALL the questions in this section.

0 1

A student investigated the voltage and current for a lamp.

FIGURE 1, on the opposite page, shows a circuit diagram for the student's circuit.

FIGURE 1



[Turn over]

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TABLE 1 shows the results.

TABLE 1

VOLTAGE / V	CURRENT / A
0.00	0.00
2.00	0.80
4.00	1.20
6.00	1.52
8.00	1.72
10.00	1.88
12.00	2.00

0 1 . 1

Name the component in FIGURE 1, on page 5, that is used to change the voltage across the lamp. [1 mark]

REPEAT OF TABLE 1

VOLTAGE / V	CURRENT / A
0.00	0.00
2.00	0.80
4.00	1.20
6.00	1.52
8.00	1.72
10.00	1.88
12.00	2.00

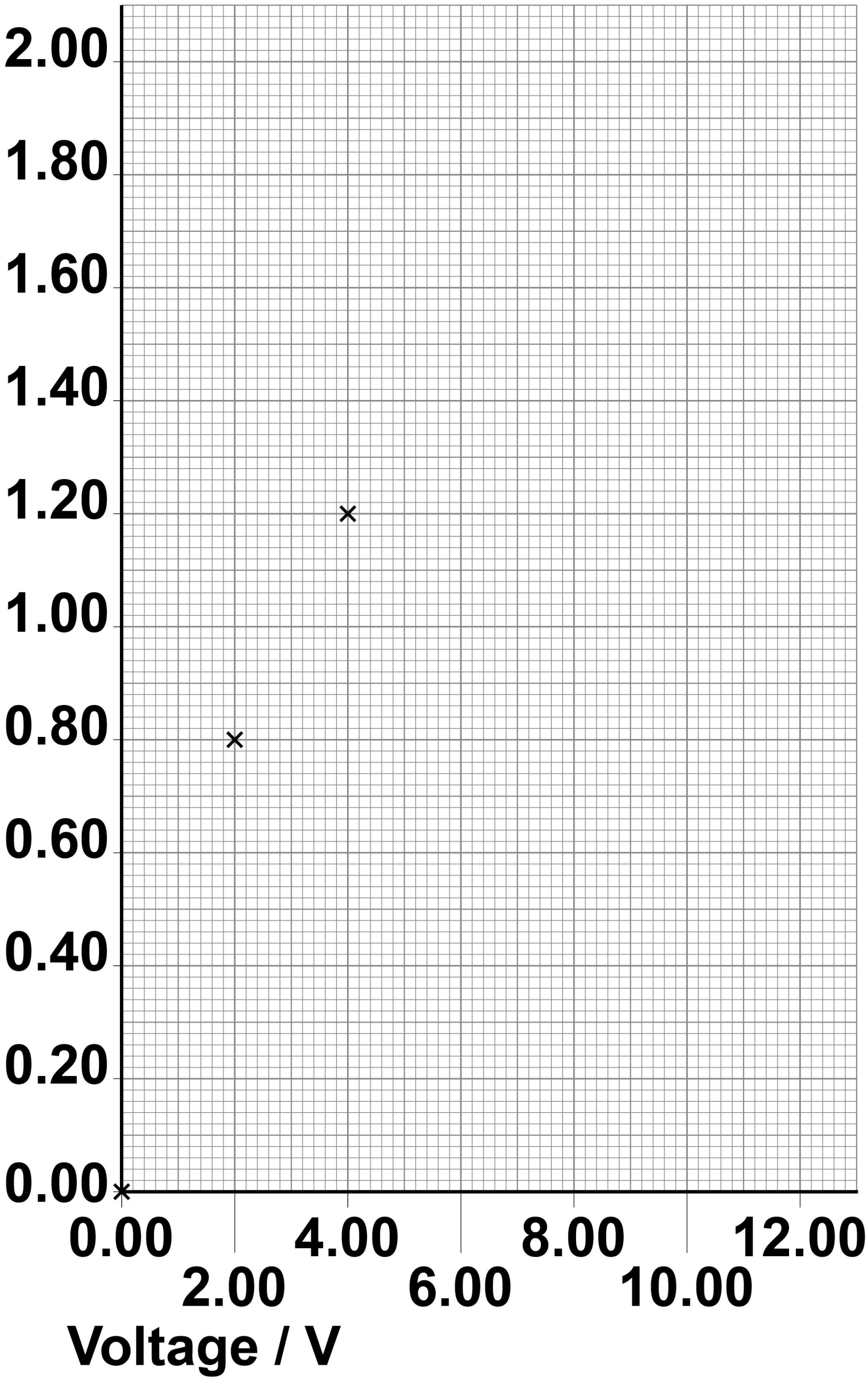
0 1 . 2

On the opposite page, plot a graph of the results shown in TABLE 1 on FIGURE 2.

The first three points have been plotted for you.

Draw a line of best fit. [2 marks]

FIGURE 2



[Turn over]

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0 1 . 3

Calculate the resistance of the lamp when the voltage is 1.00 V.

Give the unit.

Use the Formulae Sheet and data from FIGURE 2, on page 9. [3 marks]

Resistance of the lamp = _____

Unit _____

0 1 . 4

The resistance of the lamp increases as the voltage increases.

How does your line of best fit on FIGURE 2, on page 9, show this? [1 mark]

0 1 . 5

Explain why the resistance of the lamp increases as the voltage increases.

You should refer to electrons in your answer. [3 marks]

TABLE 1 is repeated below.

VOLTAGE / V	CURRENT / A
0.00	0.00
2.00	0.80
4.00	1.20
6.00	1.52
8.00	1.72
10.00	1.88
12.00	2.00

0 1 . 6

Calculate the maximum power of the lamp in this investigation.

Use the Formulae Sheet and data from TABLE 1. [1 mark]

Maximum power of the lamp = _____ W

11

0 2

A car is driven in a race.

The car accelerates from rest with a CONSTANT acceleration of 10.2 m s^{-2} for 1.7 seconds.

0 2 . 1

Calculate the speed of the car at 1.7 seconds.

Use the Formulae Sheet. [1 mark]

Speed of car at 1.7 seconds =

_____ m s^{-1}

0 2 . 2

The mass of the car is 1500 kg.

Calculate the driving force of the car's engine.

Give the unit.

Use the Formulae Sheet. [2 marks]

Driving force of the engine = _____

Unit _____

[Turn over]

0 2 . 3

Which of the following graphs A, B, C or D, on pages 20 and 21, shows how the displacement of the car changes as it accelerates during the first 1.7 seconds of the race? [1 mark]

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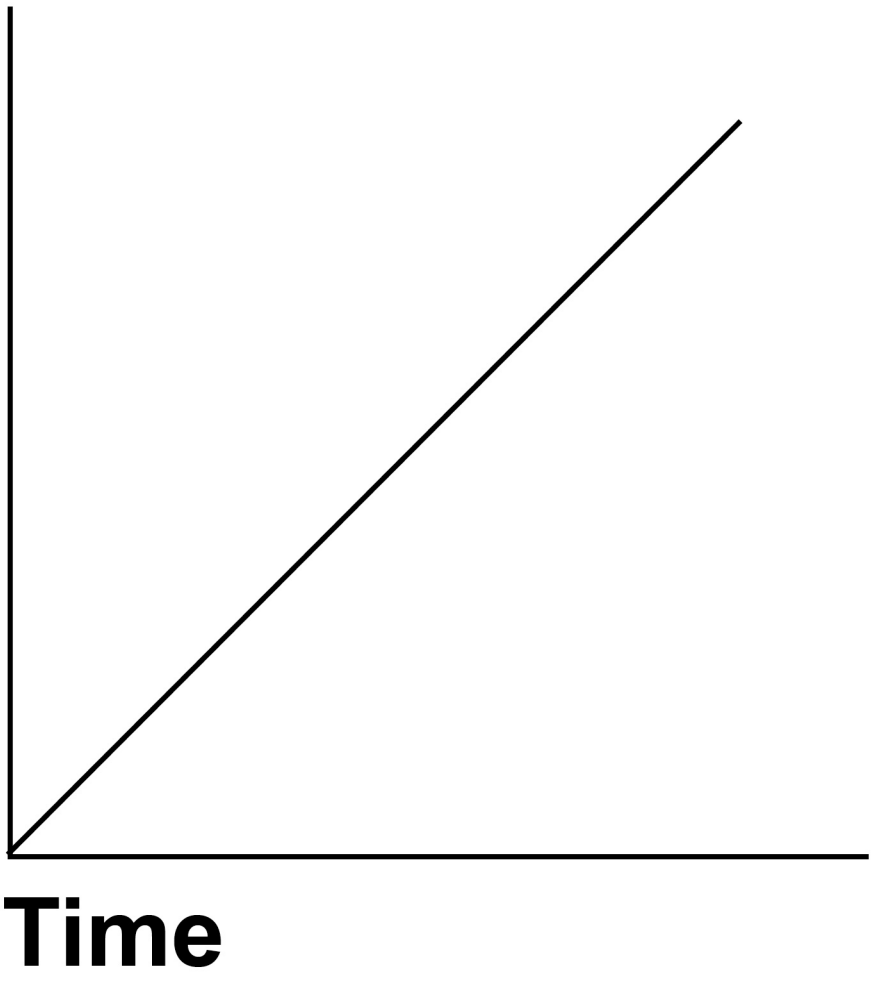
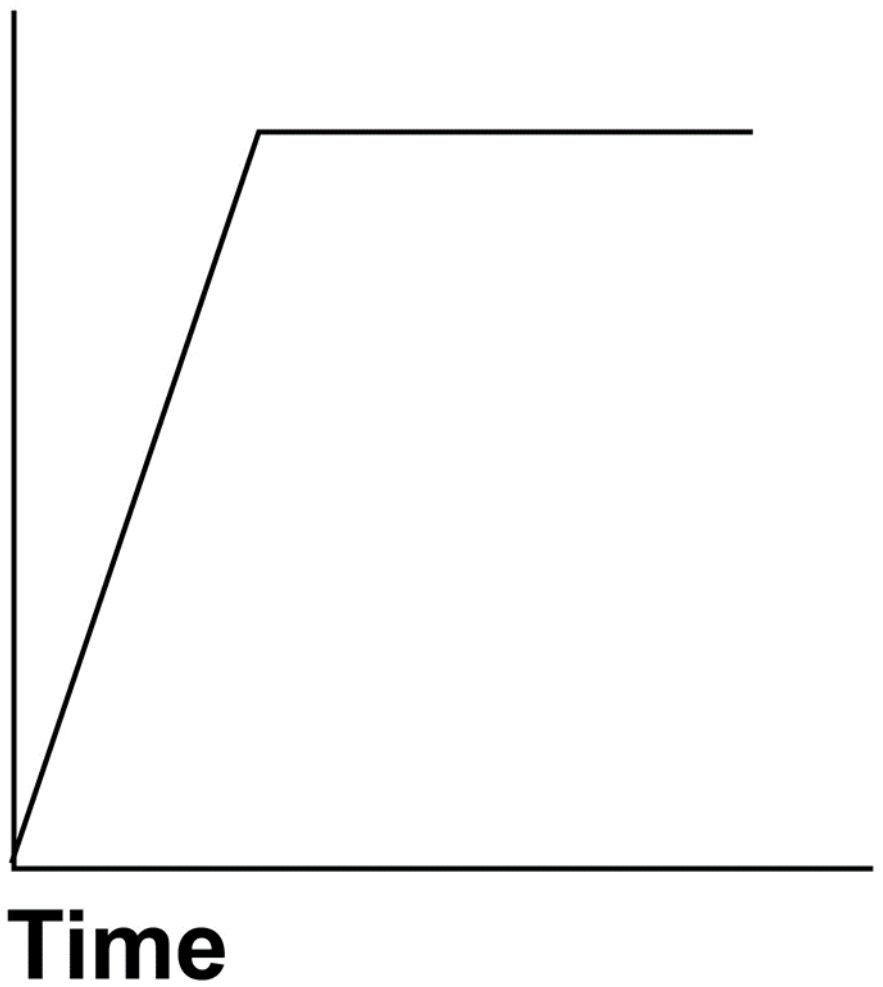
[Turn over]

Tick (✓) ONE box.

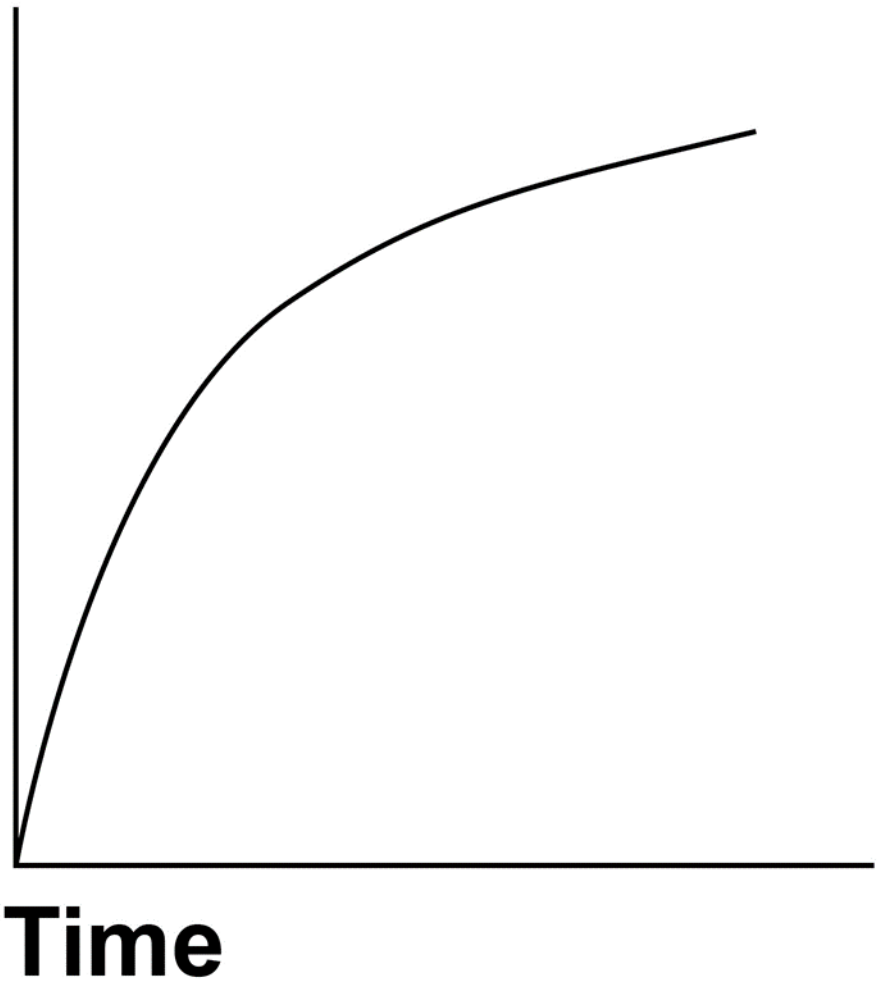
☐ **A** **Displacement**



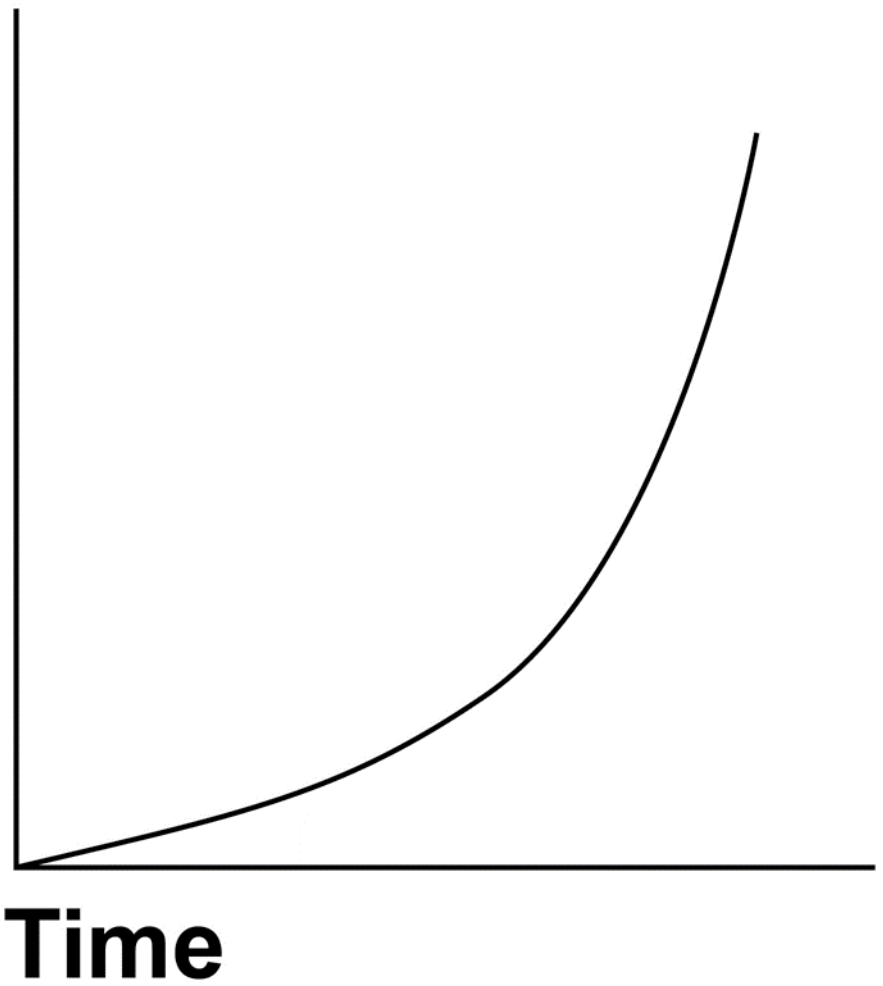
☐ **B** **Displacement**



☐ C Displacement



☐ D Displacement



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0 2 . 4

The driving force of the car's engine is the same throughout the race.

However, after 1.7 seconds the acceleration of the car is NOT constant.

Explain why the acceleration of the racing car is NOT constant after 1.7 seconds.

In your answer, you should refer to the forces involved. [3 marks]

[Turn over]

0 2 . 5

At the end of the race the driver applies the brakes to stop the car.

Describe the energy transfers when the brakes are applied. [2 marks]

END OF QUESTIONS

9

Additional page, if required.

Write the question numbers in the left-hand margin.

Additional page, if required.

Write the question numbers in the left-hand margin.

Additional page, if required.

Write the question numbers in the left-hand margin.

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For Examiner's Use	
Question	Mark
1	
2	
TOTAL	