Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

For Examiner's Use

General Certificate of Secondary Education
June 2009

ADDITIONAL SCIENCE
Unit Physics P2

PHYSICS
Unit Physics P2

PHY2F

F

Foundation Tier

Wednesday 10 June 2009 1.30 pm to 2.15 pm

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed: 45 minutes

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Answers written in margins or on blank pages will not be marked.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The maximum mark for this paper is 45.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

Advice
- In all calculations, show clearly how you work out your answer.

For Examiner's Use			
Question	Mark	Question	Mark
1		7	
2		8	
3			
4			
5			
6			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

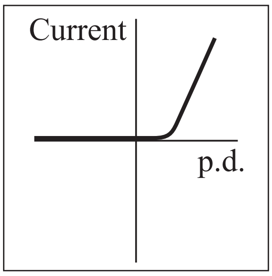
Answer **all** questions in the spaces provided.

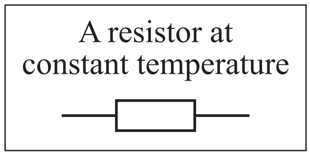
1 (a) The graphs, **A**, **B** and **C**, show how the current through a component varies with the potential difference (p.d.) across the component.

Draw a line to link each graph to the correct component.
Draw only **three** lines.

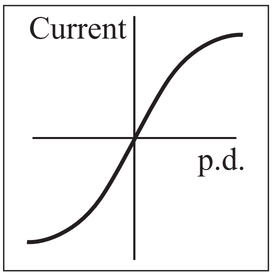
Component

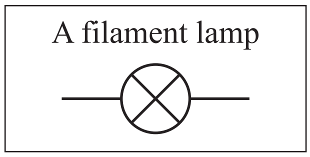
A



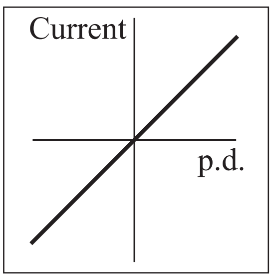


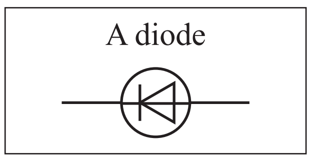
B





C

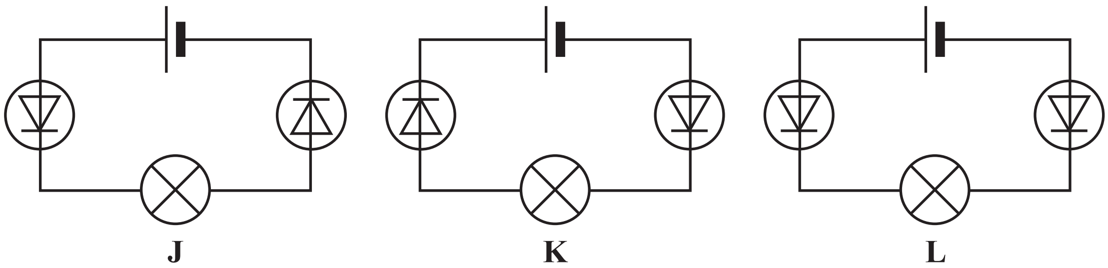




(2 marks)

Areas outside the box will not be scanned for marking

1 (b) Each of the circuits, **J**, **K** and **L**, include two diodes.



In which **one** of the circuits, **J**, **K** or **L**, would the filament lamp be on?

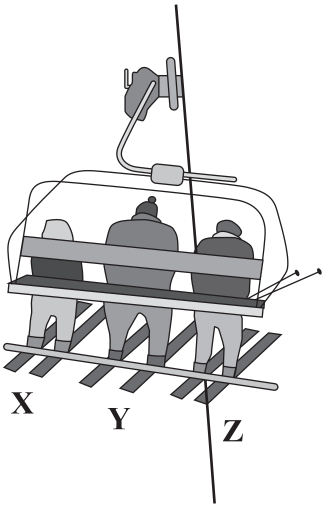
....
(1 mark)

3

Turn over for the next question

Areas outside the box will not be scanned for marking

2 (a) The diagram shows three skiers, **X**, **Y** and **Z**, on a moving chairlift.
The mass of each skier is given in the table.



Skier	Mass in kg
X	65
Y	90
Z	80

Which **one** of the skiers, **X**, **Y** or **Z**, has the most momentum?

....

Give the reason for your answer.

....

....

(2 marks)

2 (b) At one point in the journey, the chairlift accelerates to a higher speed.

What happens to the momentum of the three skiers as the chairlift accelerates?

....

(1 mark)

3

Turn over for the next question

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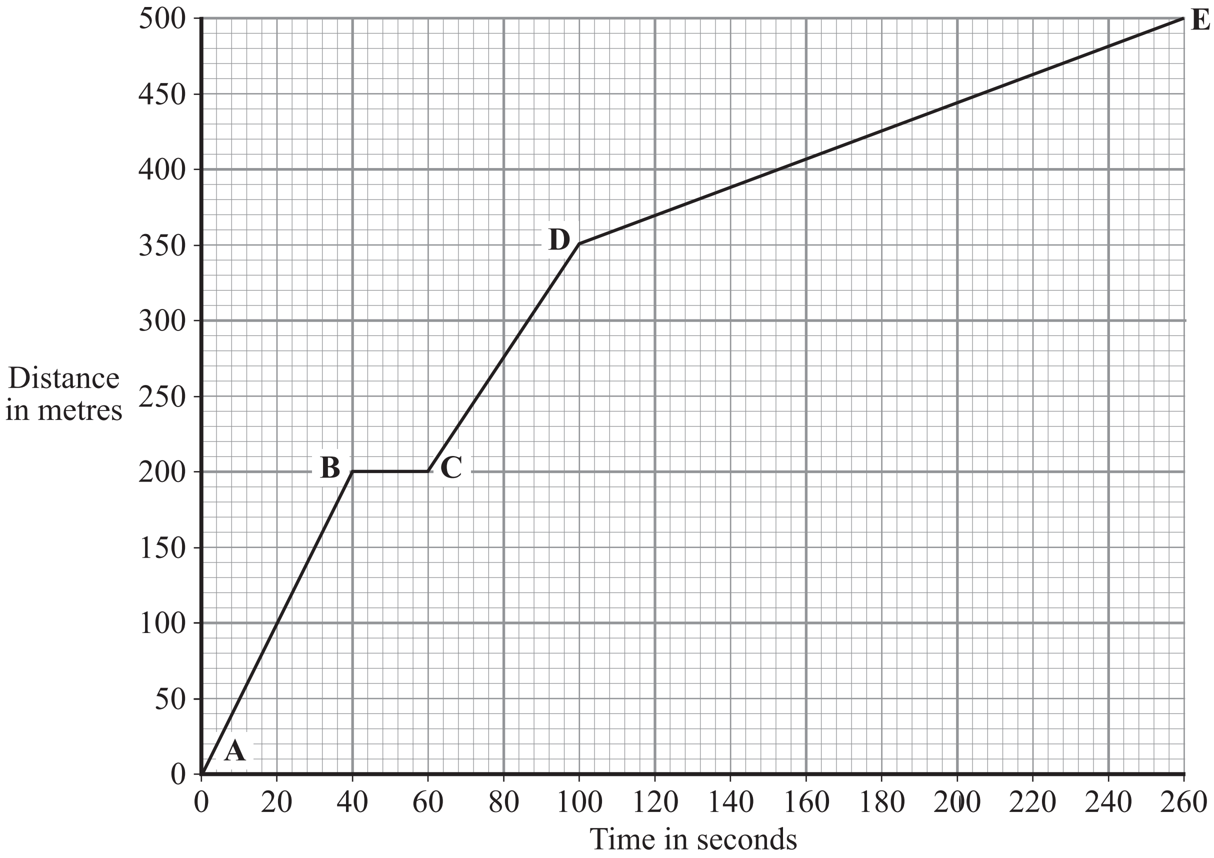
ANSWER IN THE SPACES PROVIDED

3 Part of a bus route is along a high street.
The distance – time graph shows how far the bus travelled along the high street and how long it took.



3 (a) The bus travels the **slowest** between points **D** and **E**.

How can you tell this from the graph?

....

....

(1 mark)

3 (b) Between which two points was the bus travelling the **fastest**?

Put a tick (✓) in the box next to your answer.

Points	
A – B	
B – C	
C – D	

(1 mark)

3 (c) There is a bus stop in the high street.
This is marked as point **B** on the graph.

3 (c) (i) What is the distance between point **A** on the graph and the bus stop?

Distance .... metres
(1 mark)

3 (c) (ii) How long did the bus stop at the bus stop?
Show clearly how you work out your answer.

....

Time = ... seconds
(2 marks)

3 (d) A cyclist made the same journey along the high street.
The cyclist started at the same time as the bus and completed the journey in 200 seconds. The cyclist travelled the whole distance at a constant speed.

3 (d) (i) Draw a line on the graph to show the cyclist's journey. *(2 marks)*

3 (d) (ii) After how many seconds did the cyclist overtake the bus?

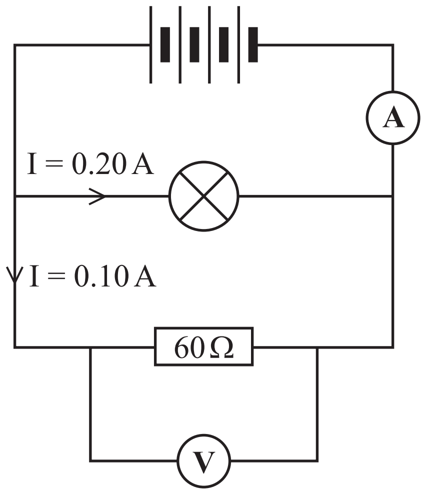
The cyclist overtook the bus after .... seconds.
(1 mark)

8

Turn over for the next question

Turn over ▶

4 A circuit was set up as shown in the diagram.



4 (a) Each cell provides a potential difference of 1.5 volts.

4 (a) (i) What is the total potential difference provided by the four cells in the circuit?

....

Total potential difference = ... volts
(1 mark)

4 (a) (ii) What will be the reading on the voltmeter?

....
(1 mark)

4 (b) The current through the lamp is 0.20 amps.
The current through the resistor is 0.10 amps.

What is the reading on the ammeter?

....

Reading on ammeter = ... amps
(1 mark)

4 (c) Use a phrase from the box to complete the following sentence.

greater than	**equal to**	**smaller than**

The resistance of the lamp is .... 60 Ω.

Give a reason for your answer.

....

....

(2 marks)

5

Turn over for the next question

Areas outside the box will not be scanned for marking

5 The diagram shows an adult and a child pushing a loaded shopping trolley.

5 (a) (i) What is the *total force* on the trolley due to the adult and child?

....

(1 mark)

5 (a) (ii) Which **one** of the terms in the box means the same as *total force*?

Draw a ring around your answer.

answer force	**mean force**	**resultant force**

(1 mark)

5 (a) (iii) The trolley is pushed at a constant speed for 80 metres.

Use the equation in the box to calculate the work done to push the trolley 80 metres.

work done = force applied × distance moved in direction of force

Show clearly how you work out your answer.

....

....

Work done = ...

(2 marks)

Areas outside the box will not be scanned for marking

5 (b) Complete the following sentences by drawing a ring around the correct word in each of the boxes.

5 (b) (i) The unit of work done is the

joule
newton
watt

.

(1 mark)

5 (b) (ii) Most of the work done to push the trolley is transformed into

heat
light
sound

.

(1 mark)

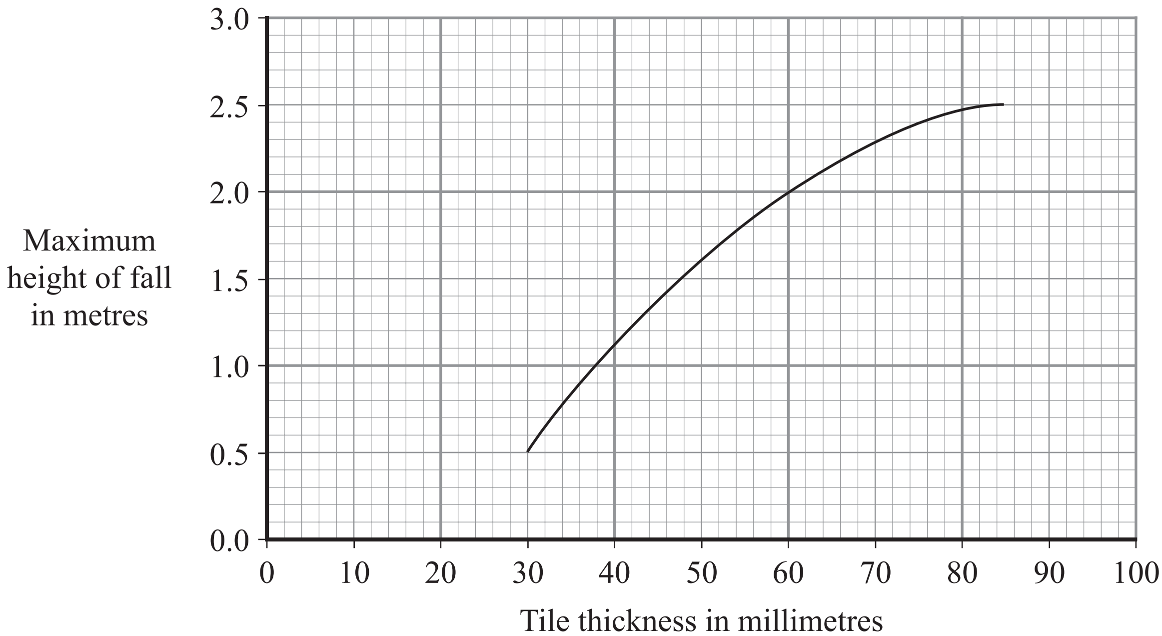
6

Turn over for the next question

6 The diagram shows a child on a playground swing.

6 (a) The playground surface is covered in rubber safety tiles. The tiles reduce the risk of serious injury to children who fall off the swing.

The graph gives the maximum height that a child can fall onto rubber safety tiles of different thicknesses and be unlikely to get a serious head injury.



6 (a) (i) Describe how the maximum height of fall relates to the thickness of the rubber safety tile.

....

....

(1 mark)

6 (a) (ii) The maximum height of any of the playground rides is 2 metres.

What tile thickness should be used in the playground?

....

Give a reason for your answer.

....

....

(2 marks)

6 (b) Use phrases from the box to complete the following sentences.

the force on	**the work done to stop**	**the time taken to stop**

6 (b) (i) Falling onto a rubber surface compared to a hard surface increases

.... the child.

(1 mark)

6 (b) (ii) Momentum is lost more slowly falling onto a rubber surface than on a hard surface.

This reduces .... the child.

(1 mark)

5

Turn over for the next question

7 The table gives information about the three types of particle that make up an atom.

Particle	**Relative mass**	**Relative charge**
Proton		+1
Neutron	1	
Electron	very small	–1

7 (a) Complete the table by adding the **two** missing values. *(2 marks)*

7 (b) Use the information in the table to explain why an atom has no overall electrical charge.

....

....

....

....
(2 marks)

7 (c) Uranium has two natural isotopes, uranium-235 and uranium-238.
Uranium-235 is used as a fuel inside a nuclear reactor.
Inside the reactor, atoms of uranium-235 are split and energy is released.

7 (c) (i) How is the structure of an atom of uranium-235 different from the structure of an atom of uranium-238?

....

....
(1 mark)

7 (c) (ii) The nucleus of a uranium-235 atom must absorb a particle before the atom is able to split.

What type of particle is absorbed?

....
(1 mark)

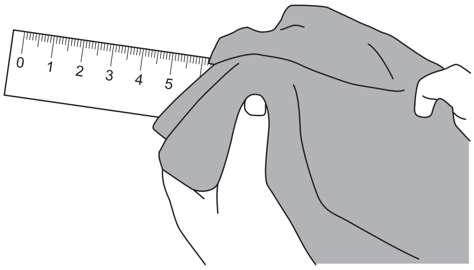
7 (c) (iii) The nucleus of an atom splits into smaller parts in a reactor.

What name is given to this process?

....
(1 mark)

7

8 (a) A plastic ruler is rubbed with a cloth.



The ruler becomes negatively charged.

8 (a) (i) Complete the following sentence by drawing a ring around the correct line in the box.

	gained electrons
The ruler becomes negatively charged because it has	lost neutrons
	lost protons

.

(1 mark)

8 (a) (ii) How could you show that the ruler is charged?

....

....

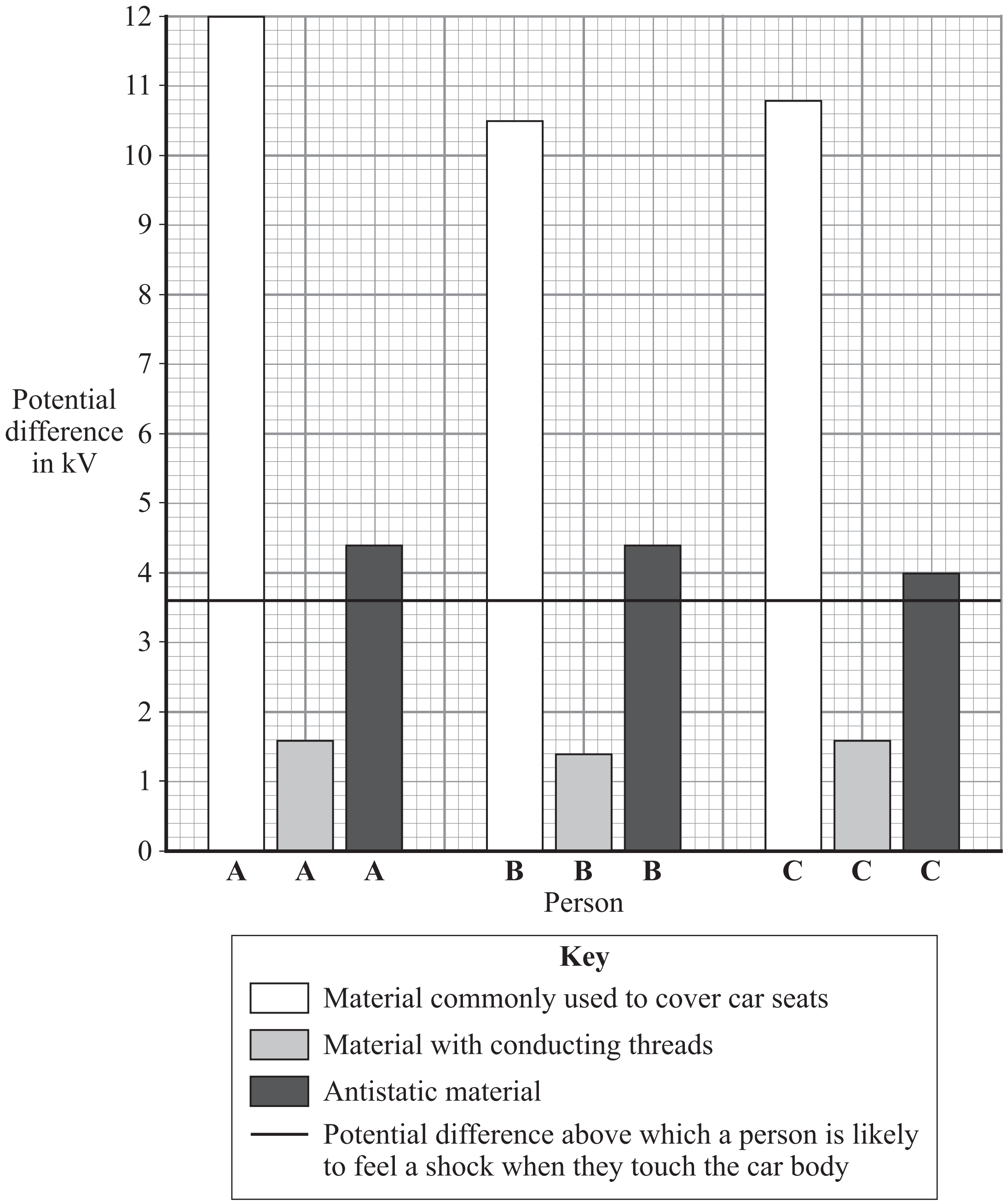
(1 mark)

Question 8 continues on the next page

8 (b) People often become electrostatically charged as they get out of a car.
This happens because their clothing rubs against the car seat.

A scientist was asked to find out whether the amount of charge on a person depended on the type of material which covered the car seat.
Three people, **A**, **B** and **C**, were used to test three different types of seat covering.

In each test, the person got out of the car and stood on a thick sheet of plastic.
The scientist then measured the potential difference between the person and the car body.
The results of the investigation are displayed in the bar chart.



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8 (b) (i) Explain why the measurement was made with the person standing on a thick sheet of plastic.

....

....

....

....

(2 marks)

8 (b) (ii) To make this a fair test, the three people, **A**, **B** and **C**, each wore the same type of clothing.

Suggest a reason why this was important.

....

....

(1 mark)

8 (b) (iii) The smallest scale division on the voltmeter was 0.1 kV.

Suggest why, from the data, it was **not** necessary to increase the precision of the potential difference measurements.

....

....

(1 mark)

8 (b) (iv) Explain why this investigation may cause a manufacturer to change the material used to cover car seats.

....

....

....

....

(2 marks)

8

END OF QUESTIONS

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