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|---------------------|--|--|--|--|--|------------------|--|--|--|--|
| Centre Number       |  |  |  |  |  | Candidate Number |  |  |  |  |
| Surname             |  |  |  |  |  |                  |  |  |  |  |
| Other Names         |  |  |  |  |  |                  |  |  |  |  |
| Candidate Signature |  |  |  |  |  |                  |  |  |  |  |

|                     |      |
|---------------------|------|
| For Examiner's Use  |      |
| Examiner's Initials |      |
| Question            | Mark |
| 1                   |      |
| TOTAL               |      |



General Certificate of Education  
Advanced Subsidiary Examination  
June 2011

# Physics PHA3/B3/XPM2 (Specifications A and B)

Unit 3 Investigative and Practical Skills in AS Physics  
Route X Externally Marked Practical Assignment (EMPA)

## Section A Part 2

**For this paper you must have:**

- a calculator
- a pencil
- a ruler.

### 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. Do not write outside the box around each page or on blank pages.
- Show all your working.
- Do all rough work in this book. Cross through any work you do not want to be marked.

### Information

- The marks for questions are shown in brackets.
- The maximum mark for Section A Part 2 is 15.



JUN11 PHA3B3X01

WMP/June11/PHA3/B3/XPM2

**PHA3/B3/XPM2**

**Section A Part 2**

Follow the instructions given below.

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

No description of the experiment is required.

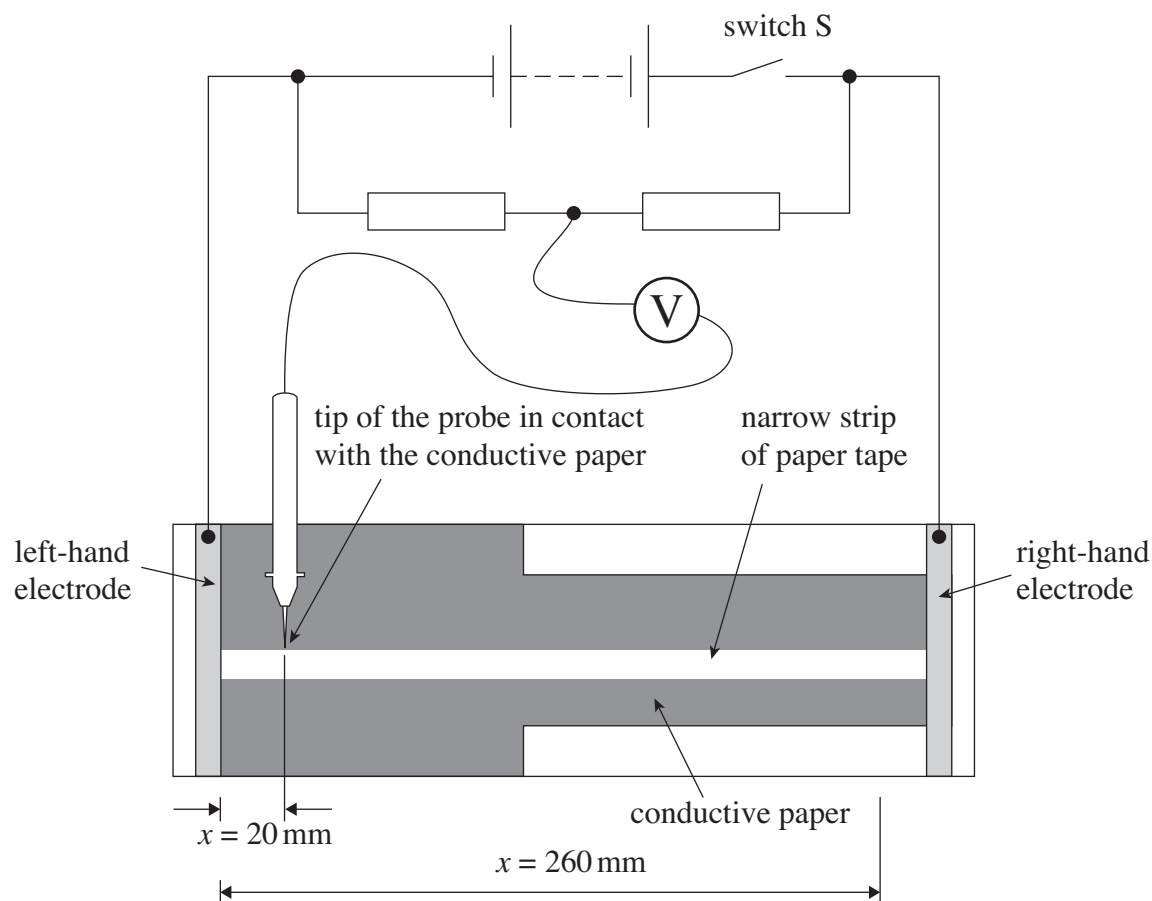
- 1** In this experiment you are to investigate the variation of potential difference along a piece of conductive paper of two different widths.

A narrow strip of paper tape has been stuck to the conductive paper.

Make a faint pencil mark on this paper tape at a distance,  $x = 20$  mm from the left-hand electrode.

- 1 (a)** Close switch S and place the tip of the probe in contact with the conductive paper next to the pencil mark as shown in **Figure 4**.

**Figure 4**



- 1 (a) (i)** Taking account of the sign shown on the meter, read and record  $V_{20}$ , the voltmeter reading when  $x = 20$  mm.

$$V_{20} = \dots\dots\dots$$

- 1 (a) (ii)** Repeating the procedure as above and taking account of the sign shown on the meter, read and record  $V_{260}$ , the voltmeter reading when  $x = 260$  mm.

$$V_{260} = \dots\dots\dots$$

- 1 (a) (iii)** Evaluate  $\frac{V_{260}}{V_{20}}$ .

$$\frac{V_{260}}{V_{20}} = \dots\dots\dots$$

(1 mark)

**Question 1 continues on the next page**

**Turn over ►**

- 1 (b) Using the same procedure as in part (a), investigate how  $V$  varies for values of  $x$  **between** 20 mm and 260 mm.  
You should take sufficient readings so that when a graph is plotted of these data, you can establish clearly how  $V$  varies with  $x$  in both the wide and narrow parts of the conductive paper.  
Open switch S when you have completed your measurements.

Record below all your measurements and observations.

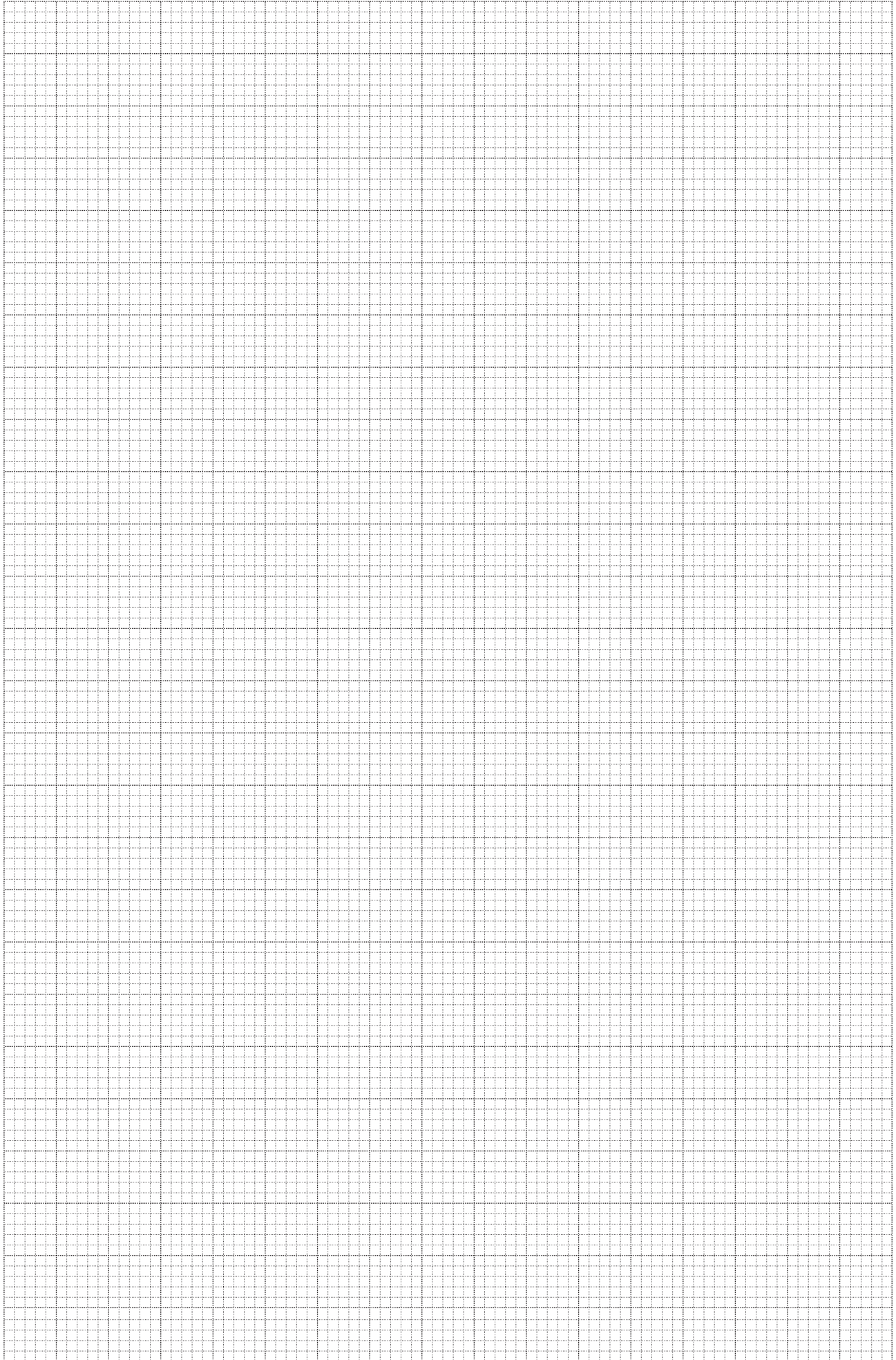
Note that the independent variable should be recorded in the **left-hand** column of your table.

(5 marks)

- 1 (c) Using all your data from part (a) and part (b), plot, on the grid on **page 5**, a graph with  $V$  on the vertical axis and  $x$  on the horizontal axis.

(9 marks)

**END OF SECTION A PART 2**



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