

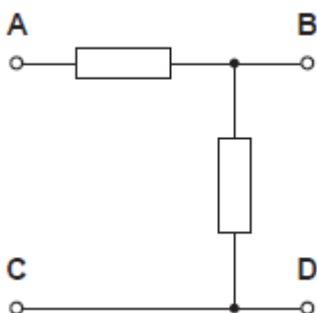
## **A Level Physics A**

**H556/03** Unified physics

**Question Set 4**

- 1 (a)\* You are given an unmarked sealed square box which has four identical terminals at each corner.

Fig 4.1 shows the circuit diagram for the contents of the box with the four terminals labelled **A**, **B**, **C** and **D**.



**Fig. 4.1**

One of the resistors in the box has resistance  $220\Omega$ . The other resistor has resistance  $470\Omega$ . Two of the terminals are connected by a wire.

The four terminals on your unmarked sealed box are **not** labelled.

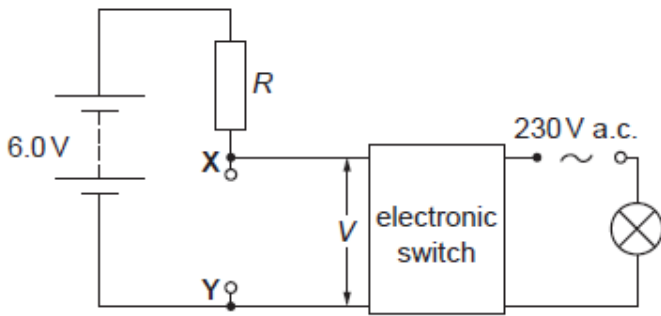
You are given a  $6.0\text{V d.c.}$  supply, a  $100\Omega$  resistor (labelled R) and a digital ammeter.

Plan an experiment to determine the arrangement of the components and identify which terminal of your unmarked sealed box is **A**, **B**, **C** and **D**.

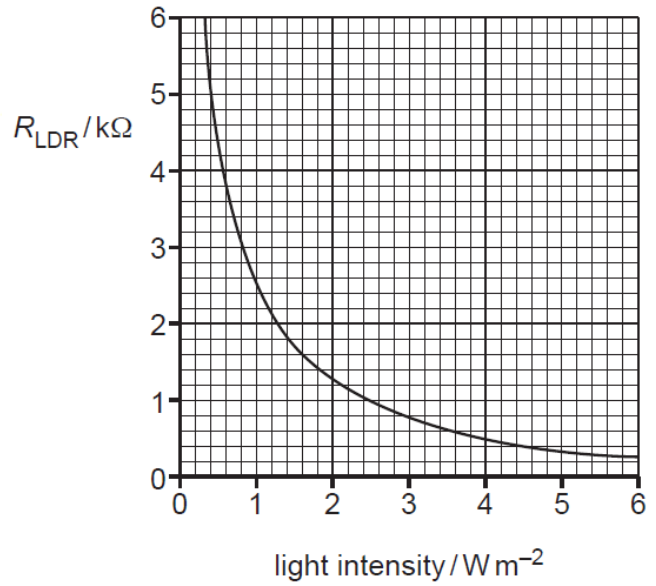
A space has been left for you to draw circuit diagrams to illustrate your answer.

[6]

(b) A light-dependent resistor (LDR) is connected between points **X** and **Y** in the circuit of Fig. 4.2. The circuit is used to switch on a lamp during the hours of darkness.



**Fig. 4.2**



**Fig. 4.3**

- (i) Draw the symbol for an LDR on Fig. 4.2 between **X** and **Y**. [1]
- (ii) Fig. 4.3 shows how the resistance of the LDR varies with light intensity. The electronic switch closes when  $V$  across **XY** is 4.0 V and opens when  $V$  across **XY** is 2.4 V. The electronic switch draws a negligible current.

Calculate

1 the resistance  $R$  of the resistor for the lamp to switch on at a light intensity of  $0.80 W m^{-2}$

$R = \dots\dots\dots \Omega$  [3]

2 the light intensity of the surroundings at which the lamp switches off.

light intensity =  $\dots\dots\dots W m^{-2}$  [2]

**Total Marks for Question Set 4: 12**

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