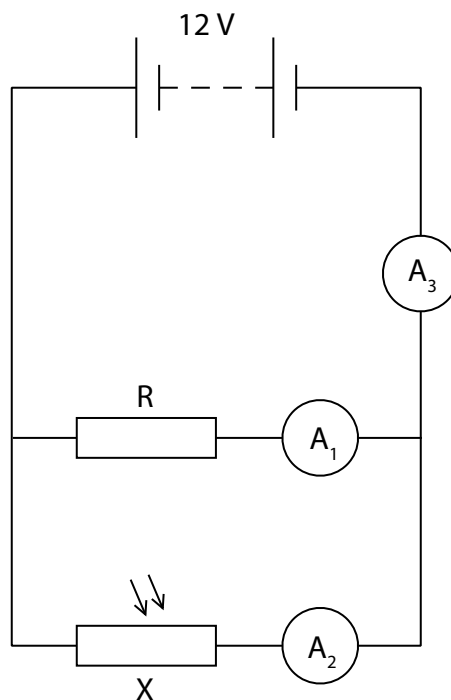


- 3 A 12V battery is connected to a component, X, and a fixed resistor, R, as shown.



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- (a) (i) State the name of component X.

(1)

- (ii) Draw a voltmeter on the circuit diagram connected to show the voltage of component X.

(2)

- (b) The voltage across component X is 12V.

The resistor R has a value of $840\ \Omega$.

Show that the current in ammeter A_1 is approximately 0.01 A.

Use the equation

$$\text{voltage} = \text{current} \times \text{resistance}$$

(2)

- (c) When the circuit is placed in daylight, the current in A_2 is 0.011 A.

- (i) Calculate the value of the current through A_3 .

(1)

current = A

- (ii) Explain what happens to the current through A_3 when the circuit is placed in a darkened room.

(2)

(Total for Question 3 = 8 marks)