

6 (a) Define electric potential difference across a component.

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..... [1]

- (b) A circuit contains four resistors and a battery of electromotive force (e.m.f.) 8.0 V with negligible internal resistance. When the variable resistor has resistance R , the currents in the circuit are 0.030 A , I_1 and I_2 , as shown in Fig. 6.1.

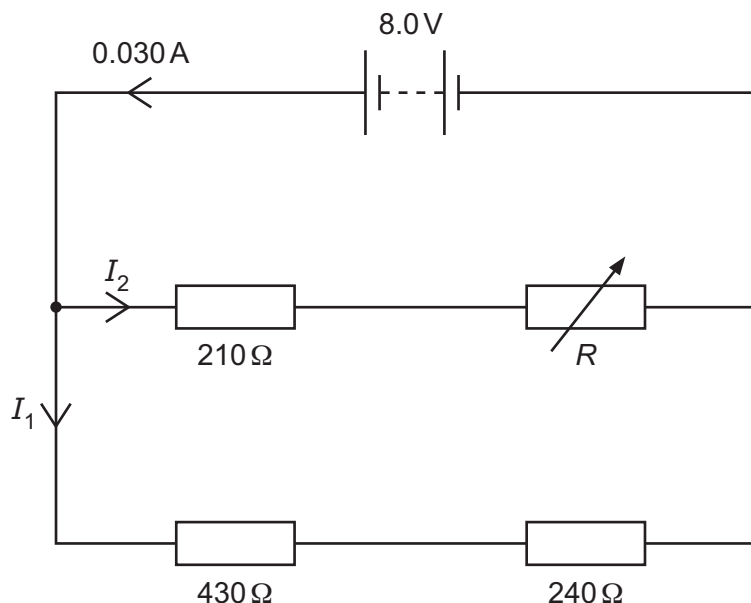


Fig. 6.1

- (i) Determine the charge passing through the battery in a time of 4.0 minutes.

charge = C [2]

- (ii) Calculate I_1 .

I_1 = A [2]





(iii) Calculate I_2 .

$I_2 = \dots\dots\dots$ A [1]

(iv) Determine R .

$R = \dots\dots\dots$ Ω [2]



- (c) The variable resistor in (b) is fitted with a scale so that its resistance can be accurately determined.

The resistor of resistance $240\ \Omega$ is now replaced by a new resistor X of unknown resistance. A galvanometer is connected as shown in Fig. 6.2.

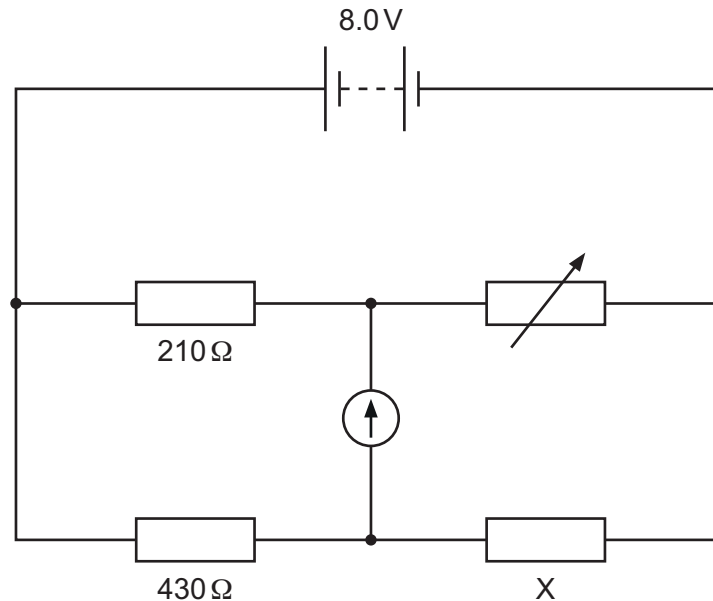


Fig. 6.2

With reference to ratios of resistances, explain how this circuit can be used to determine the resistance of X.

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