

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

..... [1]

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

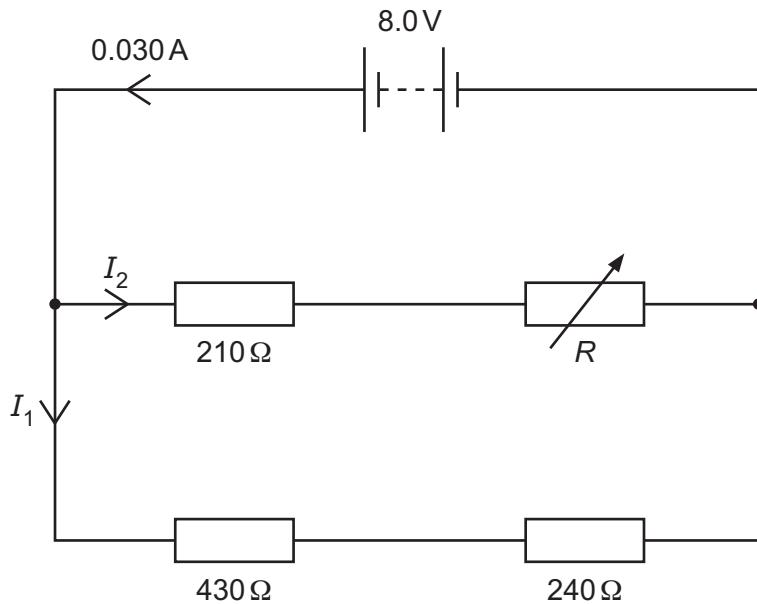


Fig. 6.1

- (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 .

$$I_2 = \dots \text{ A} [1]$$

(iv) Determine R .

$$R = \dots \Omega [2]$$





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

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

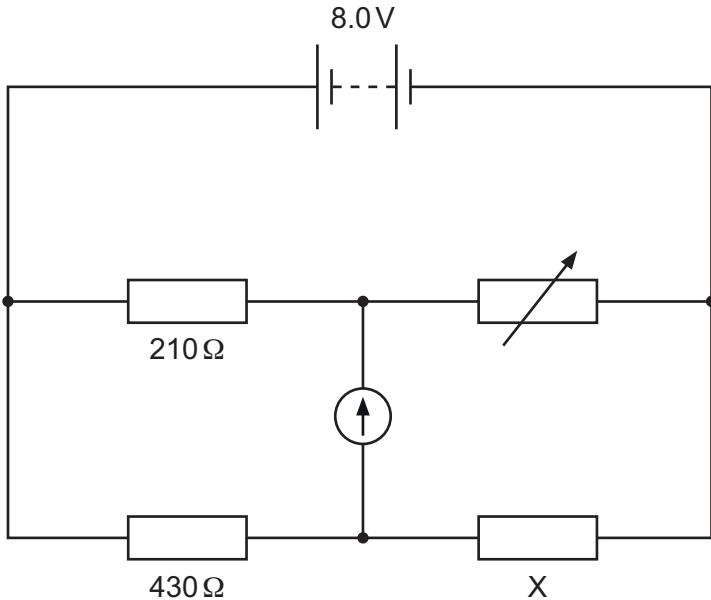


Fig. 6.2

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

.....

.....

.....

.....

.....

.....

[2]