31 There is a potential difference V across a resistor of resistance R. The current in the resistor is I.

Which equation gives the power P dissipated by the resistor?

A $P = V^2I$ **B** $P = \frac{V^2}{I}$ **C** $P = V^2R$ **D** $P = \frac{V^2}{R}$

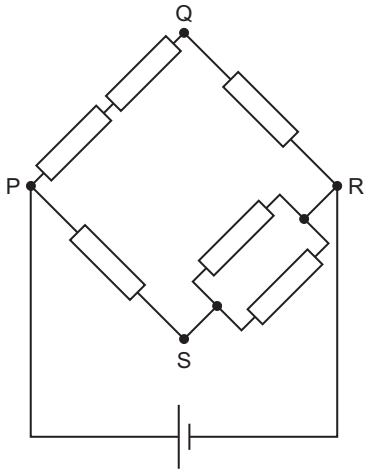
32 The current in a resistor of constant resistance is 8.0 mA. The power dissipated by the resistor is P.

The current in the resistor is increased to 12.0 mA.

What is the new power dissipated by the resistor?

A $0.44P$ **B** $0.67P$ **C** $1.5P$ **D** $2.3P$

34 The diagram shows six identical resistors connected in a circuit.



In which branch of the circuit is the most power dissipated?

A PQ **B** QR **C** RS **D** SP

30 What is equivalent to one volt?

A one coulomb per second

B one joule per coulomb

C one joule per second

D one joule second per coulomb squared

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.) 8.0 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.

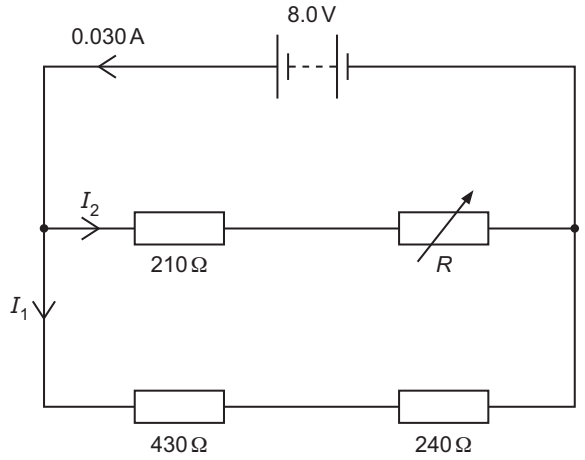


Fig. 6.1

(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 = ... A [1]

(iv) Determine R.

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

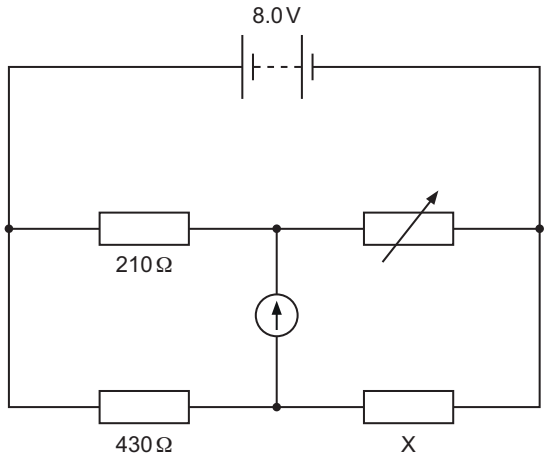


Fig. 6.2

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

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.....

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..... [2]

[Total: 10]