

- 4 (a) A circuit consists of four resistors, R_1 , R_2 , R_3 and R_4 of the same resistance R and two ammeters, A_1 and A_2 , as shown in Fig. 4.1.

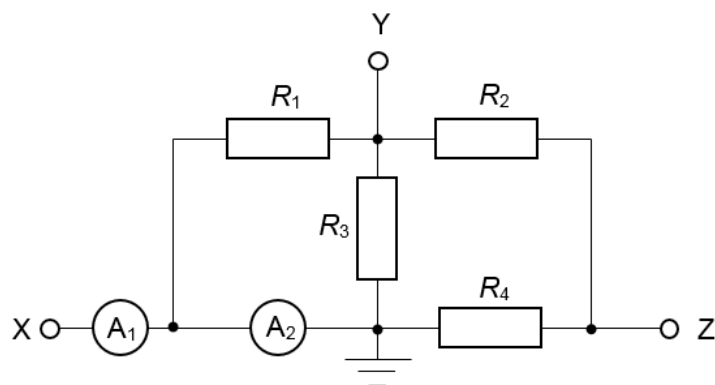


Fig. 4.1

The resistance measured between terminals X and Y is $2.4\ \Omega$.

Show that the value of resistance R is $6.0\ \Omega$.

[1]

- (b) A cell of e.m.f. 1.5 V and internal resistance $0.60\ \Omega$ is connected across the terminals X and Y.

- (i) Calculate the current reading in ammeter A_1 .

current reading in $A_1 = \dots\dots\dots\text{ A}$ [2]

- (ii) Calculate the current reading in ammeter A_2 .

current reading in $A_2 = \dots\dots\dots\text{ A}$ [3]

- (iii) The positive terminal of the cell is connected to X.
Determine the electric potential at terminal Z.

electric potential at Z = V [2]

- (iv) An additional circuit consisting of a similar cell of e.m.f 1.5 V and internal resistance $0.60\ \Omega$, a resistor S and a sensitive galvanometer G, as shown in Fig. 4.2, is now connected to the terminals X and Z.

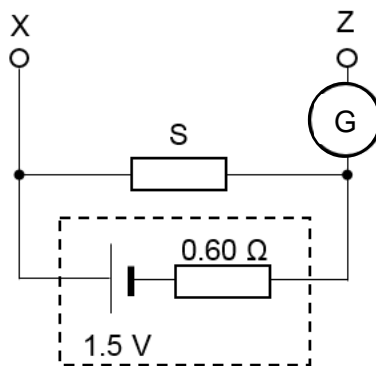


Fig. 4.2

The reading on galvanometer G is zero.

Determine the resistance of S.

resistance of S = Ω [2]