3 Fig. 3.1 shows the current-voltage (*I*-*V*) characteristics of two resistors R and X.

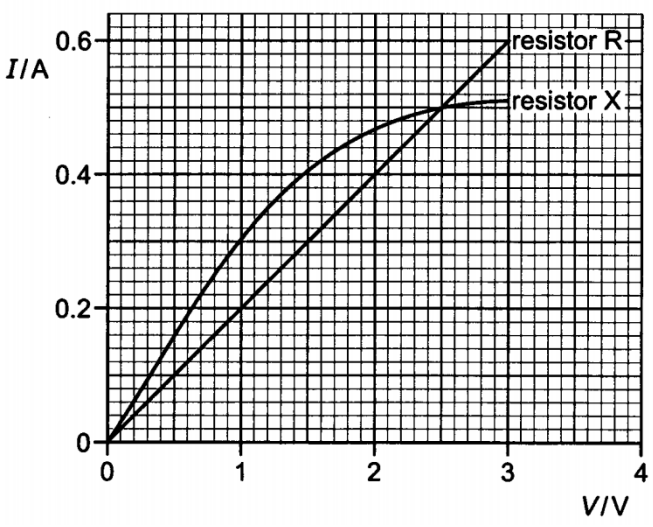

Fig. 3.1

The two resistors are connected in series with a cell of negligible internal resistance as shown in Fig. 3.2. The e.m.f. of the cell is 2.5 V.

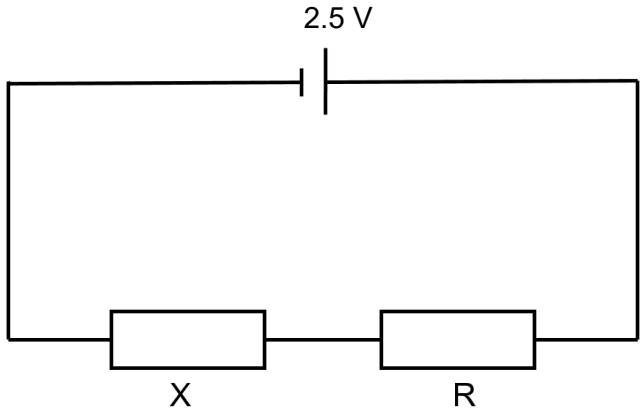

Fig. 3.2

(a) What is meant by the term *e.m.f.* of a cell?

…
……

……
.

……[2]

(b) Describe and explain how the resistance of resistor X varies with increasing potential difference with reference to the motion of the electrons.

……
.

……
.

……
.

……
.

……[3
]

(c) **(i)** Using Fig. 3.1, determine the current passing through resistor X.
Show your working clearly.

current = …… A [3]

(ii) State

1. the resistance of X

resistance of X = …… Ω [1]

2. the resistance of R

resistance of R =…… Ω [1]

[Total: 10]