5 **(a)** Three bulbs X, Y and Z are connected to a cell as shown in Fig. 5.1.

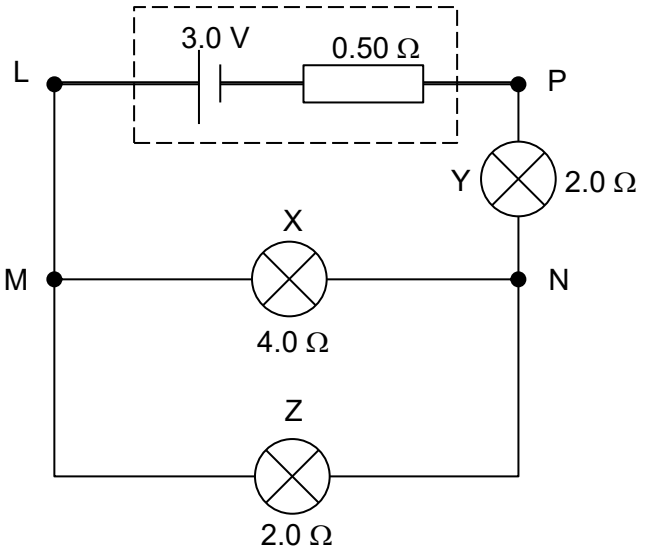

Fig. 5.1

The cell has an e.m.f. 3.0 V and internal resistance 0.50 Ω.

(i) Determine the terminal potential difference across LP.

terminal potential difference = ... V [2]

(ii) List the three light bulbs in order of increasing brightness.

increasing order: ....., ..., ... [1]

(b) The circuit in Fig. 5.1 was connected to a potentiometer consisting of a 6.0 V battery in series with a resistor of resistance R = 1.0 Ω, and a uniform wire AB of length 100.0 cm and resistance 2.0 Ω, as shown in Fig. 5.2.

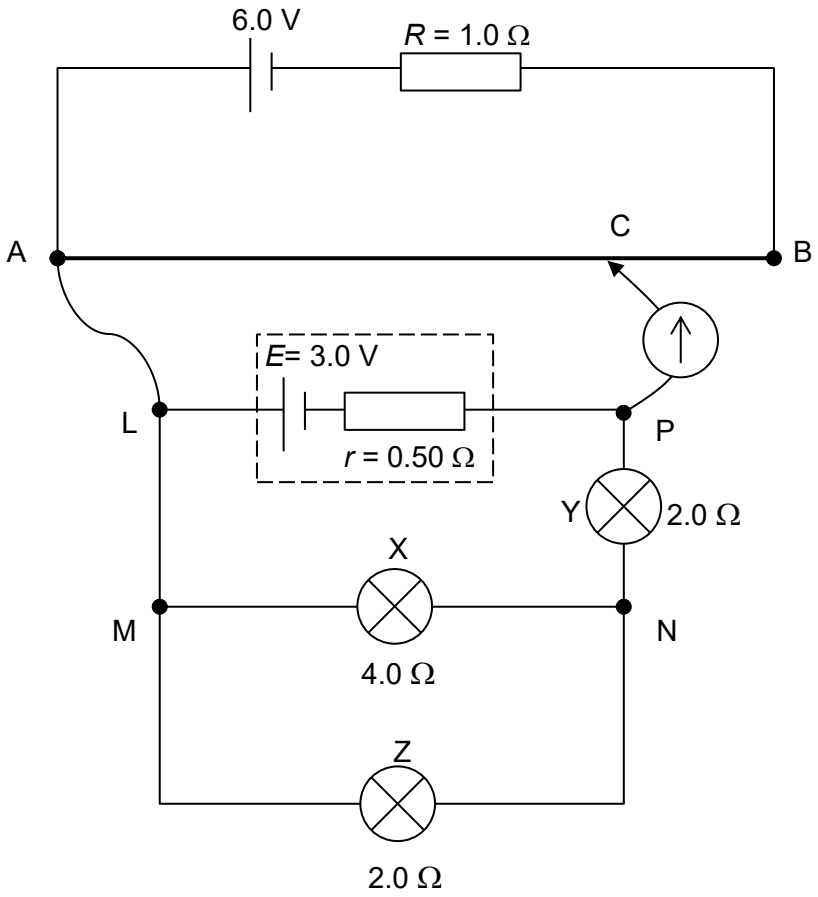

Fig. 5.2

(i) Determine the potential difference across AB.

potential difference = ... V [1]

(ii) Determine the balance length AC.

length AC = ... cm [2]

(iii) Explain how the balance length AC will be affected if bulb X is replaced by a bulb which has a lower resistance.

……

……

……

…… [2]