

5 (a) Define electric potential difference (p.d.).

.....
..... [1]

(b) A power supply, three resistors and a component X are connected in the circuit shown in Fig. 5.1.

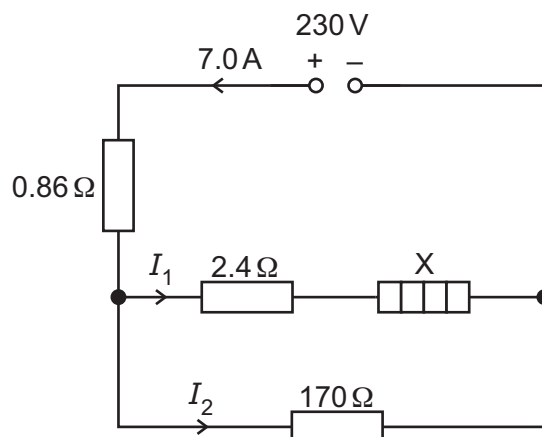


Fig. 5.1

The power supply has an electromotive force (e.m.f.) of 230 V and negligible internal resistance. The current in the power supply is 7.0 A.

(i) Identify component X.

..... [1]

(ii) Show that the p.d. across the resistor of resistance $0.86\ \Omega$ is 6.0 V.

[1]

(iii) Determine the current I_1 .

$I_1 = \dots\dots\dots$ A [2]





(iv) Calculate the p.d. across component X.

p.d. = V [2]

(v) Calculate the power dissipated in component X.

power = W [2]

(vi) The purpose of the circuit is to provide power to component X.

Determine the percentage efficiency of the circuit.

efficiency = % [2]

(vii) The resistor of resistance 170Ω is removed, leaving an open circuit in the lower branch of the circuit. There is no change to the resistance of component X.

State whether the current in the power supply increases, decreases or remains the same.

..... [1]