5 (a) State Kirchhoff's second law.

(b) A battery of electromotive force (e.m.f.) 5.6V and internal resistance *r* is connected to two external resistors, as shown in Fig. 5.1.

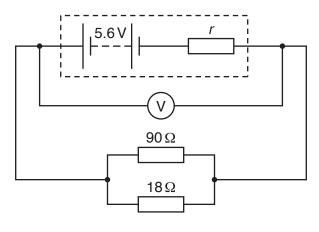


Fig. 5.1

The reading on the voltmeter is 4.8 V.

- (i) Calculate:
 - 1. the combined resistance of the two resistors connected in parallel

combined resistance = Ω [2]

2. the current in the battery.

current = A [2]

(ii) Show that the internal resistance r is 2.5Ω .

	(iii)	Detern	nine	the	ratio
--	---	------	--------	------	-----	-------

power dissipated by internal resistance *r* total power produced by battery

ratio =		[3]	ĺ
---------	--	-----	---

(c) The battery in (b) is now connected to a battery of e.m.f. 7.2 V and internal resistance 3.5Ω . The new circuit is shown in Fig. 5.2.

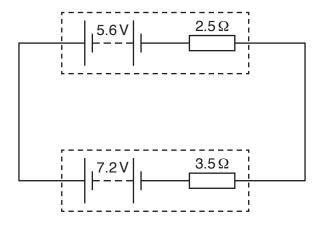


Fig. 5.2

Determine the current in the circuit.

current = A [2]

[Total: 13]