C6 Internal Resistance

$^{8}/_{10}$

C6.1 Give the missing values in the table:

e.m.f /V	Internal Resistance /Ω	Current /A	Terminal p.d. /V	Load Resistance /Ω
12.0	(a)	20	10.2	
12.0	0.12	72	(b)	
230.0	0.53	(c)	227.5	
6.0	(d)		4.2	4.3
(e)	3.2		21.3	12.0

C6.2 A school high voltage power supply unit has an e.m.f. of 5.0 kV. If short circuited, the current must be no more than 5.0 mA. Calculate the internal resistance of the supply needed in order to achieve this.

C6.3 A small battery is powering a powerful lamp. The terminal p.d. is 11.3 V, and the current flowing is 10.2 A. Assuming that the battery has an internal resistance of 2.4 Ω, calculate the e.m.f. of the battery.

C6.4 A high-resistance voltmeter is connected in parallel with a portable battery used to start cars. Before the car is connected, the meter reads 12.4 V. When the car is connected, and a 64 A current is flowing, the meter reads 11.5 V.

a) What is the e.m.f. of the battery?

b) What is the internal resistance of the battery?

C6.5 You are building a power supply which needs to be able to handle currents of zero to 10 A. Assume that you build it to have a terminal p.d. of 13.5 V when disconnected, and 10.5 V when supplying 10 A. (a) State the e.m.f. (b) Calculate the internal resistance of the supply.