

**Mark scheme for Extension Worksheet – Topic 5,
Worksheet 3**

- 1 a** Because $V = \mathcal{E} - Ir$ the internal resistance is the (negative) slope of the line; which is equal to 1.5Ω . [2]
- b** The emf is the vertical intercept which however cannot be obtained from the graph. So we need the equation of the line: the slope is -1.5 and goes through the point $I = 2 \text{ A}$, $V = 3 \text{ V}$ so $V - 3 = -1.5(I - 2) \Rightarrow V = -1.5I + 6$; this says that the emf is 6.0 V . [2]
- c** The maximum current is the horizontal intercept which is also inaccessible but now we have the equation of the line. Substituting $V = 0$; gives
$$I = \frac{6.0}{1.5} = 4.0 \text{ A}$$
 [2]