1. What mass of chromium can be produced from the electrolysis of a solution of CrCl$_3$ with a current of 15 A for 1 hr?

2. An aqueous solution of an unknown salt of manganese ion is electrolyzed by a current of 4.20 A passing for 35 minutes. If 1.00 g of Mn is produced at the cathode, what is the charge on the manganese ions in solution?

3. In the electrolysis of water to form hydrogen and oxygen gases, which is correct?
   a. hydrogen is produced at the anode
   b. hydrogen is produced at the cathode
   c. oxygen is produced at the cathode
   d. both gases are produced at the anode
   e. both gases are produced at the cathode
4. Consider the following galvanic cell at 25 °C. \[ \text{Pb} | \text{Pb}^{2+} (1.0 \text{ M}) \ || \ \text{Au}^{3+} (1.0 \text{ M}) | \text{Au} \]

a. Identify the anode and cathode and oxidizing and reducing agents.

b. Calculate \( \varepsilon^0 \), \( \Delta G^0 \) and \( K \) for the reaction.

c. Calculate the potential of the cell at after the concentration of \( \text{Pb}^{2+} \) has changed by 0.90 M.

5. Calculate \( \varepsilon \) for the concentration cell at 25 °C: