Unit 5 – Chapter 16: Electrochemistry **Name _____**

Assignment #5: Electrolytic Cells & Coulombs, Ampere, Joules, kWh Calculations **Period _____**

1) An electrolytic cell produces aluminum from Al_2O_3 at the rate of ten kilograms a day. Assuming a 100% yield,
    a. How many moles of electrons must pass through the cell in one day?
    b. How many amperes are passing through the cell?
    c. How many moles of oxygen (O_2) are being produced simultaneously?

2) A baby's spoon with an area of 6.26 cm^2 is plated with silver from $AgNO_3$ using a current of 2.00 A for two hours and 25 minutes.
    a. If the current efficiency is 82.0%, how many grams of silver are plated?
    b. What is the thickness of the silver plate formed (d = 10.5 g/cm^3)?

3) A lead storage battery delivers a current of 6.00 A for one hour and 22 minutes at a voltage of 12.0 V.
    a. How many grams of lead are converted to $PbSO_4$?
    b. How much electrical energy is produced in kilowatt hours?

4) Calcium metal can be obtained by the direct electrolysis of molten $CaCl_2$ at a voltage of 3.2V.
    a. How many joules of electrical energy are required to obtain 12.0 lb of calcium? (1 lb = 453.59 grams)
    b. What is the cost of the electrical energy obtained in the above question if electrical energy is sold at the rate of nine cents per kilowatt hour?