

**Friday Worksheet**

**Name:** .....

**Electrolysis worksheet 1**

1) A student prepares 1.0 M aqueous solutions of  $\text{AgNO}_3$ ,  $\text{Fe}(\text{NO}_3)_2$ ,  $\text{Cu}(\text{NO}_3)_2$  and  $\text{KNO}_3$ . Equal volumes of each solution are placed in separate beakers, identical platinum electrodes are placed in each beaker and each solution undergoes electrolysis with a current of 1.21Amps applied for 5.00 minutes at a voltage of 4.50 volts, under SLC. Each cathode is then dried and weighed to determine mass change.

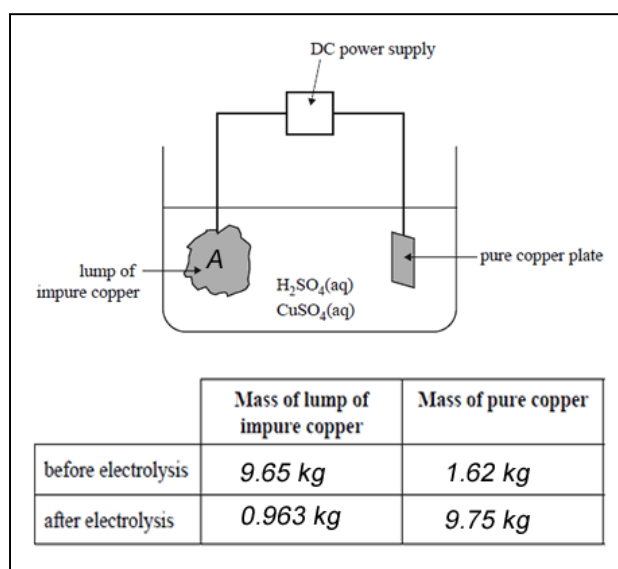
a) Write the equation for the half-reaction occurring at the anode and cathode of each cell.

b) What is the mass of each metal deposited in grams?

2) An electrolytic process known as electro-refining is the final stage in producing highly purified copper. In a small-scale trial, a lump of impure copper is used as one electrode and a small plate of pure copper is used as the other electrode. The electrolyte is a mixture of aqueous sulfuric acid and copper sulfate.

a) What is the polarity of the terminal to which the lump of impure copper is to be attached.

b) In a trial experiment, the electrodes were weighed before and after electrolysis. Conditions in the electrolytic cell shown on the right are carefully controlled to ensure a high degree of copper purity and electrical efficiency. The results are provided in the table on the right.



On the basis of these results

i. calculate a percentage purity of the lump of impure copper

c) Use the mass of pure copper deposited, that is given in the table above, to determine the time, in hours, taken for this electrolysis reaction to be completed. Assume the current was a constant 28 A.