# PRACTICE TEST 2– Redox AS913913, 3 credits

### Time allowed: 1 hour

### Resources: Resource sheet with SRP values and colour/appearance

QUESTION 1: Electrolysis of aqueous CuCl 2

Stephena sets up an electrolysis cell using copper chloride solution and carbon electrodes. She notices that bubbles of a colourless gas are produced at one electrode and a red-brown coating forms on the other electrode.

* Use the following E° values as well as your sheet: (H2O/H2) 0.00 V (H2O/O2) +1.23 V
* Draw a picture showing how aqueous copper chloride could be electrolysed with carbon electrodes.
* Decide what species gets oxidised and what species gets reduced and justify this decision with oxidation numbers or electron transfer
* Write balanced equations (half and full) for the reaction
* Calculate an E°cell and explain its significance
* Write what would be observed at each electrode and link to the species involved

QUESTION 2: Electrochemical cell comparison

Stephena now sets up an electrochemical cell as follows: in one half cell is a solution of copper ions and a copper electrode and in the other is a solution of gold ions and a gold electrode.

* Draw a cell diagram of the galvanic cell (optional)
* Decide what species gets oxidised and what species gets reduced and justify this decision with oxidation numbers or electron transfer
* Write balanced equations (half and full) for the reaction
* Calculate an E°cell and explain its significance
* Write what would be observed in each half cell and link to the species involved

Finally: COMPARE and CONTRAST the two cells in terms of their spontaneity and energy changes.

### Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- | --- |
|  | A | M | E |
| Identifies oxidation and reduction reaction in both cells with reasons (either transfer of electrons or change in oxidation number) | identification with either electron transfer or ON | number of electrons or ∆ON | linked to either species or atom in species |
| Reference requirement of energy for electrolytic cell and reduction potentials for electrochemical cell | electrolytic produces V, electrochemical requires V | spontaneous or not with minor error  | spontaneous or not with no errors |
| Balanced half equations for both cells |  | ½ | full |
| Relates observations to species |  | ¾ | all |
| Reduction potentials calculated |  |  | with unit (V) |
| Compare and contrast the oxidation–reduction processes occurring in electrolytic and electrochemical cells, including elaborating on the spontaneity of the reactions. Include fully balanced equations and correct calculations |  |  |  |