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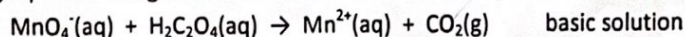
Electrochemistry In-Class Assignment

Provide the oxidation number of the underlined element. [KU – 6 marks]

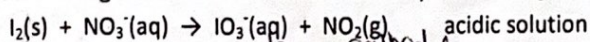
- (a) NO₃⁻ (d) Cr₂O₇²⁻
- (b) NiSO₄ (e) Br₂
- (c) KClO₃ (f) C₂O₄²⁻



2. Balance the following equation using the ion-electron method. Show your work. [MC – 5 marks]



3. Balance the following equation using the oxidation method. Show your work. [MC – 5 marks]



anode *cathode*

4. In an experiment, the following cell is set up, Zn(s) | Zn²⁺(aq) || Co²⁺(aq) | Co(s).

- (a) Draw a diagram of this cell. Include the beakers, salt bridge (with sodium nitrate), specific electrodes, specific electrolytes, external circuit and voltmeter. [1 – 4 marks]
- (b) Indicate the direction of electron flow on the diagram. [1 – 1 mark]
- (c) Indicate direction of ion flow, from the salt bridge, on the diagram. [2 marks]
- (d) Label anode and cathode under the appropriate compartment. [1 – 2 marks]
- (e) Write out the ½-cell reactions occurring in each compartment under the appropriate compartment. Include the ½-cell potentials. [1 – 4 marks]
- (f) Write out the overall cell reaction and calculate the E_{cell}. [1 – 2 marks]
- (g) Circle and label the oxidizing and reducing agents. [1 – 2 marks]

5. Predict anode, cathode and net cell reactions for each electrolytic cell. Calculate the minimum voltage that must be applied. [1 – 8 marks]

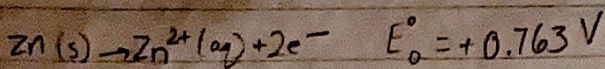
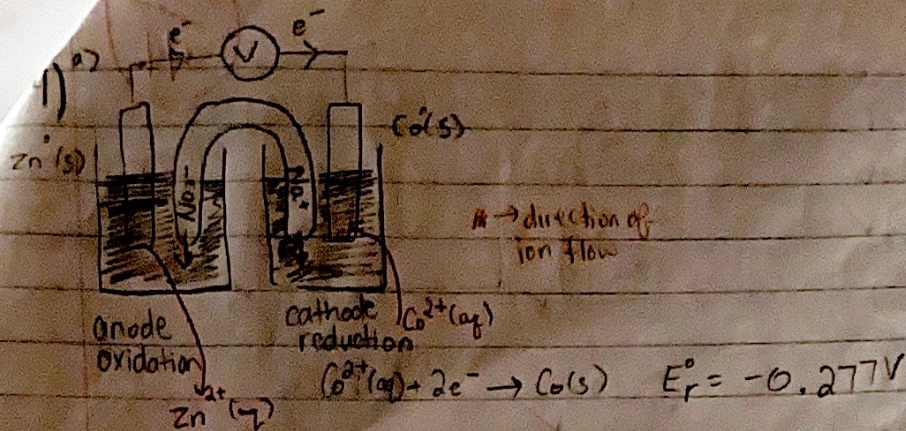
- (a) C(s) | Na⁺(aq), Br⁻(aq) | C(s) → *or Pt is used*
- (b) Cu(s) | Cu²⁺(aq), SO₄²⁻(aq) | Cu(s)

MC /10 marks

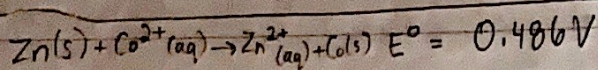
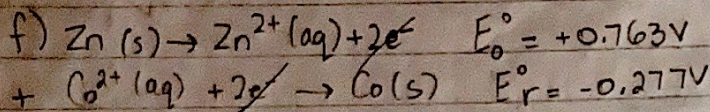
KU /6 marks

I /25 marks

TOTAL /41 marks



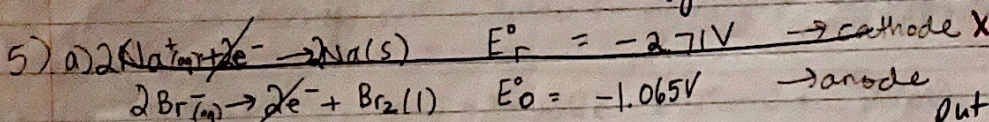
1b I



g) Zn → reducing agent
 Co^{2+} → oxidizing agent x

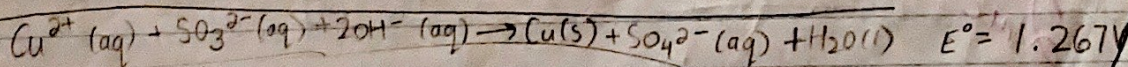
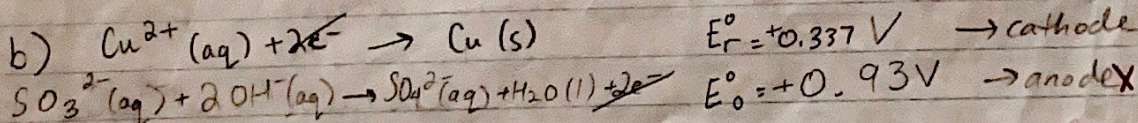
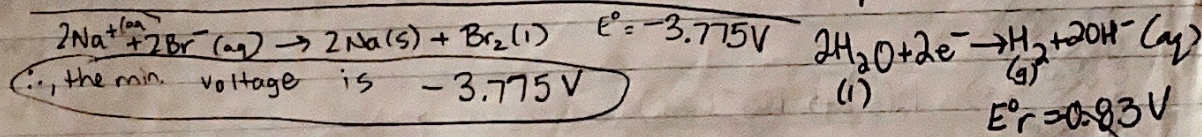
ignore this line

cathode b/c more likely to occur



put in H₂O rxn →

4 I



∴ the min. voltage is 1.267V

min. voltage → add up

$E^{\circ} -0.83 + (-1.065) = -1.895$

min voltage → flip so 1.895

