**LABASA SANGAM (SKM) COLLEGE**

**HOME STUDY PACKAGE**

**WORKSHEET NUMBER 7**

**STUDENT NAME:_____** **YEAR: 13 _____**

**SUBJECT: CHEMISTRY** **DUE DATE: 6TH SEPTEMBER, 2021**

Write the answers in the space provided.

1. Use the standard electrode potentials given in the table below to answer the questions that follow.

| Redox Couple | $E°$ Values |
|---|---|
| $I_{2(s)}/I^-_{(aq)}$ | $E°$ = +0.54 V |
| $Co^{3+}_{(aq)}/Co^{2+}_{(aq)}$ | $E°$ = +1.82 V |
| $Fe^{3+}_{(aq)}/Fe^{2+}_{(aq)}$ | $E°$ = +0.77 V |
| $Mg^{2+}_{(aq)}/Mg_{(s)}$ | $E°$ = -2.37 V |

(**Note:** Redox couple is a reducing species and its corresponding oxidising form.)

a. Which ion is the strongest oxidising agent?

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b. Calculate the SRP for $Br_{2(aq)}/Br^-_{(aq)}$ if the emf of the cell $Fe^{2+}_{(aq)}/Fe^{3+}_{(aq)}//Br_{2(aq)}/Br^-_{(aq)}$ is +0.32 V?

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c. Which two redox couples could be combined to form the electrochemical cell that will give the largest cell voltage under standard conditions?

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2. Consider the half-equations for a galvanic cell shown below.

$$2Ag^+_{(aq)} + 2e^- \rightarrow 2Ag_{(s)} \qquad E° = +0.80\ V$$
$$Cu^{2+}_{(aq)} + 2e^- \rightarrow Cu_{(s)} \qquad E° = +0.34\ V$$

Calculate the standard cell potential ($E°$cell) for the above reaction in which all species are present in their standard states.

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3. Calculate the $E°$cell for the following redox reaction in which all species are present in their standard states.

$$Zn^{2+}_{(aq)} + Pb_{(s)} \rightarrow Zn_{(s)} + Pb^{2+}_{(aq)}$$

Note: The relevant half equations are:

$$Zn^{2+}_{(aq)} + 2e^- \rightarrow Zn_{(s)} \qquad E° = -0.76\ V$$
$$Pb^{2+}_{(aq)} + 2e^- \rightarrow Pb_{(s)} \qquad E° = -0.13\ V$$

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4. An electrochemical cell is set-up using a silver rod placed in 1.0 mol L-1 silver ions and a nickel rod placed in a solution of nickel ions. The two half-cells are connected by a salt bridge and a voltmeter.

$$Ni_{(s)}/Ni^{2+}_{(aq)}//Ag^{+}_{(aq)}/Ag_{(s)}$$

| | |
|---|---|
| $Ag^{+}_{(aq)}/Ag_{(s)}$ | $E° = +0.80\ V$ |
| $Ni^{2+}_{(aq)}/Ni_{(s)}$ | $E° = -0.25\ V$ |

a. Draw a labelled diagram of the cell based on the given cell notation. Show clearly the anode, cathode and the direction of electron flow.

b. Identify the: Oxidant: _____

Reductant: _____

b. Write the net ionic equation for the reaction.

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c. Calculate the $E°$cell value of the cell.

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