

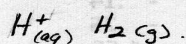
4. The unit of measurement for the potential of a galvanic cell is the volt.

5. True or False: The measured voltage of a working electrochemical cell is always positive.

6. In the standard half cell the E on the notation  $E^\circ$  represents cell potential.

7. In the standard half cell the  $^\circ$  on the notation  $E^\circ$  represents standard.

8. What two species are present in the standard half cell for oxidation or reduction to take place.



9. Write the two reactions possible in the standard half cell and state which would occur when the half cell is acting as the anode and which would occur when the half cell is acting as the cathode.

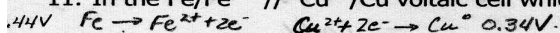
a. The standard half cell will act as the anode with another half cell with a positive reduction potential.

b. The standard half cell will act as the cathode with another half cell with a negative reduction potential.

10. Which three of the following are standard conditions for the half cell:

0.0 °C, 25 °C, 100.0 °C, 0.10 M, 1.0M, 10.0 M, 0.01 atm, 0.10 atm, 1.0 atm

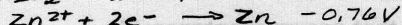
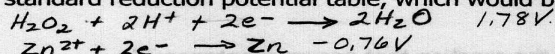
11. In the  $Fe/Fe^{2+} // Cu^{2+}/Cu$  voltaic cell which electrode is acting as the anode?



Which electrode would be gaining in mass?

The copper would gain mass.

12. Using the standard reduction potential table, which would be the better oxidizing agent,  $H_2O_2$  or  $Zn^{2+}$ ?



$H_2O_2$

13. What is the significance of a standard reduction potential that has a negative value?

The cell will most likely be oxidized. It will be a good reducing agent.

14. Calculate the  $E^\circ_{cell}$  and indicate if the SHE half cell will gain  $e^-$  (cathode) or lose  $e^-$  (anode) when the SHE half cell is connected to half cells containing the following at standard conditions.

a. Ag in  $Ag^+$   $Ag^+ + e^- \rightarrow Ag \quad 0.80V$  SHE half cell will lose  $e^-$

b. Cl in  $Cl_2$   $Cl_2 + 2e^- \rightarrow 2Cl^- \quad 1.36V$  SHE half cell will lose  $e^-$

c. Cu in  $Cu^{2+}$   $Cu^{2+} + 2e^- \rightarrow Cu^\circ \quad 0.34V$  SHE half cell will lose  $e^-$

d. Zn in  $Zn^{2+}$   $Zn^{2+} + 2e^- \rightarrow Zn^\circ \quad -0.76V$  SHE half cell will gain  $e^-$

e. Mg in  $Mg^{2+}$   $Mg^{2+} + 2e^- \rightarrow Mg^\circ \quad -2.37V$  SHE half cell will gain  $e^-$

f. Fe in  $Fe^{3+}$   $Fe^{3+} + 3e^- \rightarrow Fe^\circ \quad -0.036V$  SHE half cell will gain  $e^-$