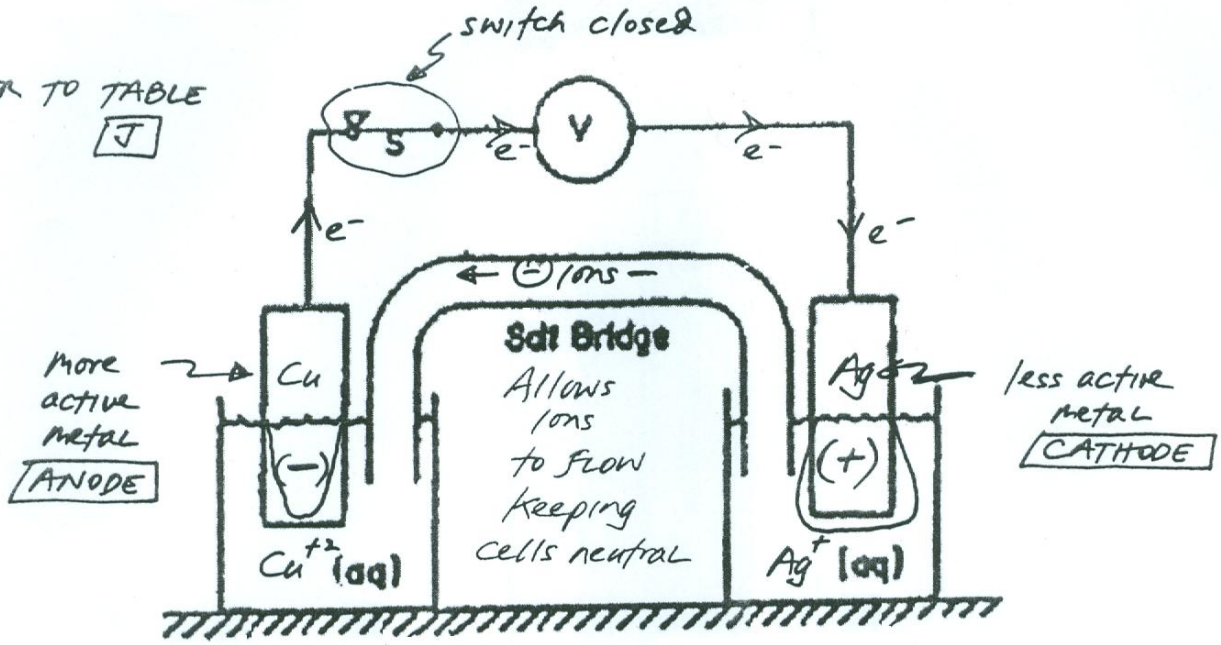
Voltaic Cells 2

REFER TO TABLE $\boxed{J}$



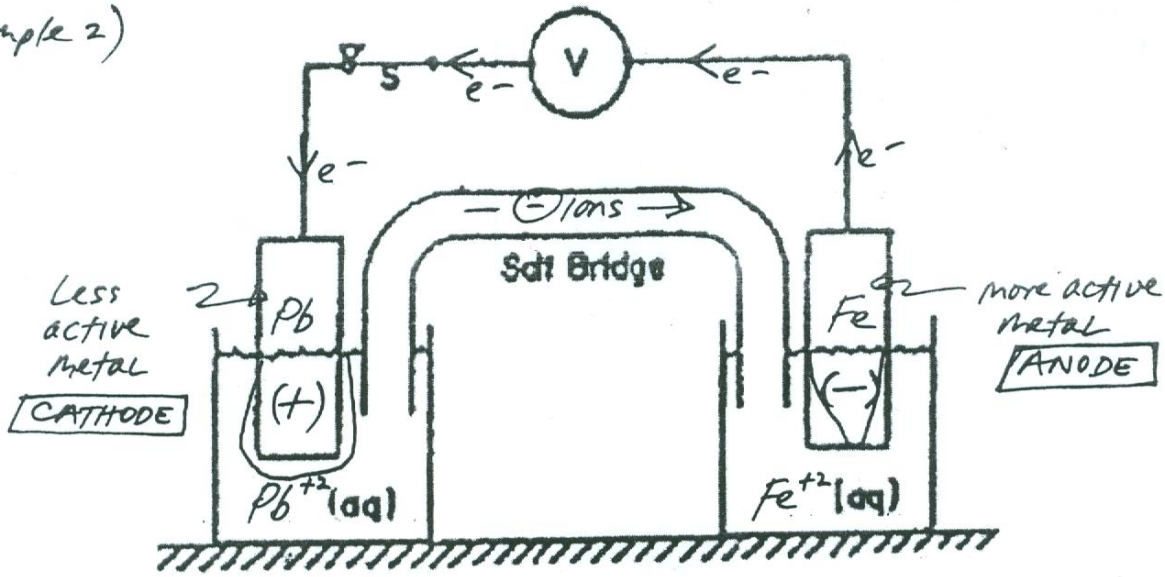
$$Ag^+ + Cu^\circ \rightarrow Cu^{+2} + Ag^\circ$$

OXIDATION	REDUCTION
$Cu^\circ \rightarrow Cu^{+2} + 2e^-$	$\boxed{2}(Ag^+ + e^- \rightarrow Ag^\circ)$

multiply by $\boxed{2}$ b/c # e- lost must = # e- gained

* e- flow spontaneously from the more active to less active metal *

Example 2)



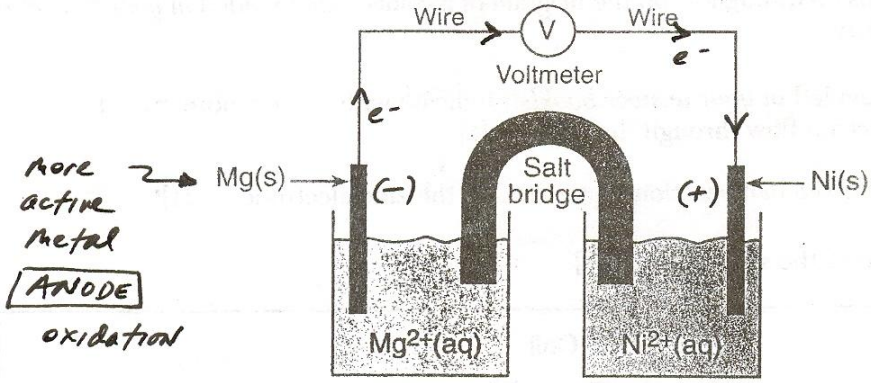
$$Pb^{+2} + Fe^\circ \rightarrow Fe^{+2} + Pb^\circ$$

REDUCTION	OXIDATION
$Pb^{+2} + 2e^- \rightarrow Pb^\circ$	$Fe^\circ \rightarrow Fe^{+2} + 2e^-$

NOTE ANODE gets "thinner", CATHODE gets "fatter".

REMEMBER: An ox and Red Cat

Base your answers to questions 71 through 73 on the diagram of a voltaic cell and the balanced ionic equation below.



June 05

$Mg(s) + Ni^{2+}(aq) \longrightarrow Mg^{2+}(aq) + Ni(s)$

71 What is the total number of moles of electrons needed to completely reduce 6.0 moles of $Ni^{2+}(aq)$ ions? [1]

6 ($Ni^{+2} + 2e^- \rightarrow Ni^0$) Ans: 12 mole e-

72 Identify *one* metal from Reference Table *J* that is more easily oxidized than Mg(s). [1]

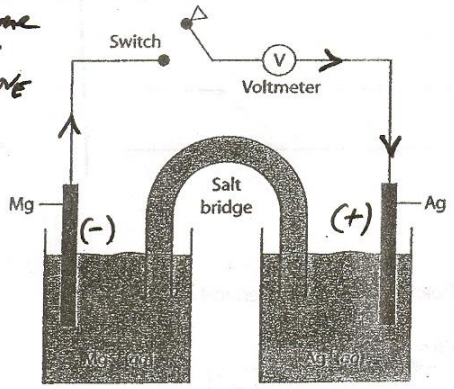
Any metal above Mg is more active (more easily oxidized).

73 Explain the function of the salt bridge in the voltaic cell. [1]

Allows ions to flow.

27. The diagram below represents a voltaic cell.

same as above



$Mg(s) + 2Ag^+(aq) \longrightarrow Mg^{2+}(aq) + 2Ag(s)$

Which species is oxidized when the switch is closed?

(1) Mg(s) (3) Ag(s)
(2) $Mg^{2+}(aq)$ (4) $Ag^+(aq)$

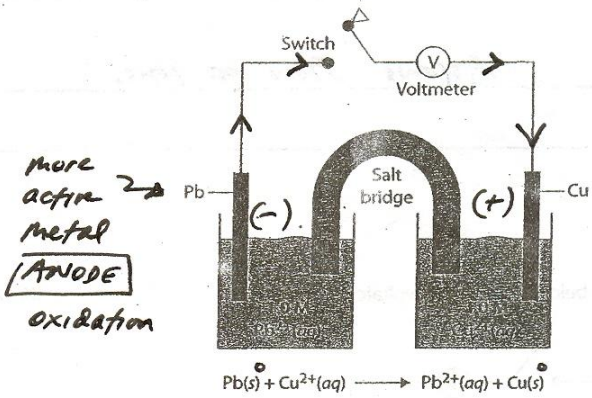
reactants ↓ products ↑

28. The overall reaction in an electrochemical cell is $Zn(s) + Cu^{2+}(aq) \rightarrow Cu(s) + Zn^{2+}$. As the reaction in this cell takes place,

"An ox & red cat"

(1) oxidation occurs at the cathode
(2) the Cu^{2+} is oxidized
(3) the concentration of Zn^{2+} increases
(4) the concentration of Cu^{2+} increases

29. The diagram below represents an electrochemical cell.



$Pb(s) + Cu^{2+}(aq) \longrightarrow Pb^{2+}(aq) + Cu(s)$

Which change occurs when the switch is closed?

(1) Pb is oxidized, and electrons flow to the Cu electrode.
(2) Pb is reduced, and electrons flow to the Cu electrode.
(3) Cu is oxidized, and electrons flow to the Pb electrode.
(4) Cu is reduced, and electrons flow to the Pb electrode.

30. Consider the following equation.

$2Cr(s) + 3Cu^{2+}(aq) \rightarrow 2Cr^{3+}(aq) + 3Cu(s)$

Which reaction occurs at the cathode in this voltaic cell?

(1) reduction of $Cu^{2+}(aq)$
(2) reduction of Cu(s)
(3) oxidation of $Cr^{3+}(aq)$
(4) oxidation of Cr(s)

REDUCTION, ↓ OXID #