Name: _____

___ 1) Given the reaction:

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

Which represents the correct half-reaction for the reduction that occurs?

1) $Cu^{2+}(aq) + 2e^- \longrightarrow Cu(s)$
2) $Cu(s) \longrightarrow Cu^{2+}(aq) + 2e^-$
3) $Cu(s) + 2e^- \longrightarrow Cu^{2+}(aq)$
4) $Cu^{2+}(aq) \longrightarrow Cu(s) + 2e^-$

___ 2) In the reaction $Cl_2 + H_2O \longrightarrow HClO + HCl$, the hydrogen is

1) oxidized, only
2) neither oxidized nor reduced
3) both oxidized and reduced
4) reduced, only

___ 3) Which half-reaction correctly represents reduction?

1) $Cr^{3+} + 3e^- \longrightarrow Cr(s)$
2) $Cr(s) + 3e^- \longrightarrow Cr^{3+}$
3) $Cr^{3+} \longrightarrow Cr(s) + 3e^-$
4) $Cr(s) \longrightarrow Cr^{3+} + 3e^-$

___ 4) Given the overall cell reaction:

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

Which of the following will occur as the cell operates?

1) The amount of Zn(s) will increase.
2) The amount of Ag(s) will decrease.
3) The concentration of $Ag^+(aq)$ will increase.
4) The concentration of $Zn^{+2}(aq)$ will increase.

___ 5) A redox reaction *always* involves

1) a change in oxidation number
2) the transfer of protons
3) the formation of ions
4) a change of phase

___ 6) In a voltaic cell composed of two half-cells, ions are allowed to flow from one half-cell to another by means of

1) a voltmeter
2) a salt bridge
3) an external conductor
4) electrodes

___ 7) The oxidation number of nitrogen is *highest* in

1) N_2
2) NH_3
3) NO_2
4) N_2O

___ 8) Given the reaction:

$Zn(s) + 2H^+(aq) + 2Cl^-(aq) \longrightarrow Zn^{2+}(aq) + 2Cl^-(aq) + H_2(g)$

Which species is oxidized?

1) $H_2(g)$
2) $H^+(aq)$
3) $Cl^-(aq)$
4) Zn(s)

___ 9) What is the oxidation number of sulfur in H_2SO_4?

1) +4
2) 0
3) +6
4) -2

___ 10) In the reaction $Mg + Cl_2 \longrightarrow MgCl_2$, the correct half-reaction for the oxidation that occurs is

1) $Cl_2 \longrightarrow 2Cl^- + 2e^-$
2) $Mg + 2e^- \longrightarrow Mg^{2+}$
3) $Mg \longrightarrow Mg^{2+} + 2e^-$
4) $Cl_2 + 2e^- \longrightarrow 2Cl^-$

___ 11) The type of reaction in an voltaic cell is *best* described as a

1) nonspontaneous oxidation-reduction reaction
2) spontaneous oxidation reaction, only
3) nonspontaneous oxidation reaction, only
4) spontaneous oxidation-reduction reaction

___ 12) In the reaction $Zn^0 + Cu^{2+} \longrightarrow Zn^{2+} + Cu^0$, which species is oxidized?

1) Zn^0
2) Cu^0
3) Cu^{2+}
4) Zn^{2+}

___ 13) The oxidation number of nitrogen in N_2O is

1) +2
2) +1
3) -1
4) -2

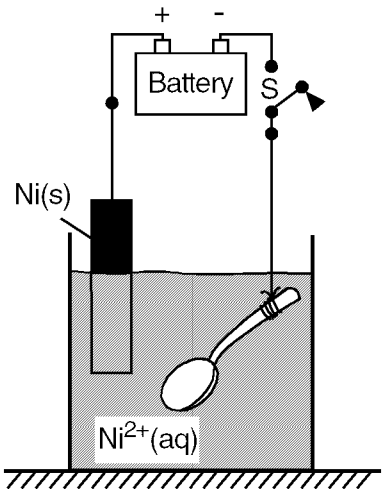
___ 14) What is the oxidation number of oxygen in HSO_4^-?

1) -2
2) -4
3) +6
4) +1

___ 15) Which half-reaction correctly represents the oxidation which occurs in the reaction $Cl_2 + 2Br^-(aq) \longrightarrow 2Cl^-(aq) + Br_2$?

1) $Cl_2 \longrightarrow 2Cl^- + 2e^-$
2) $2Br^- \longrightarrow Br_2 + 2e^-$
3) $2Br^- + 2e^- \longrightarrow Br_2$
4) $Cl_2 + 2e^- \longrightarrow 2Cl^-$

___ 16) The diagram below shows a spoon that will be electroplated with nickel metal.



What will occur when switch *S* is closed?

1) The spoon will gain mass, and the Ni(s) will be oxidized.
2) The spoon will lose mass, and the Ni(s) will be reduced.
3) The spoon will gain mass, and the Ni(s) will be reduced.
4) The spoon will lose mass, and the Ni(s) will be oxidized.

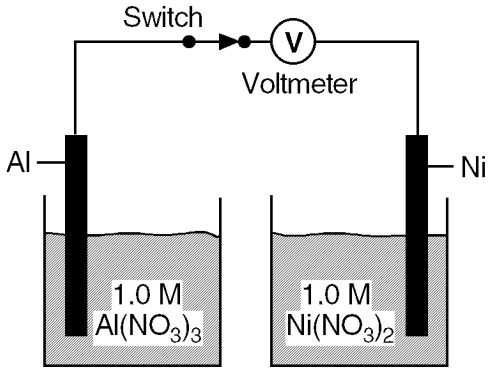
___ 17) Given the unbalanced equation:

$$\_\_Br_2 + \_\_Sn \longrightarrow \_\_Br^- + \_\_Sn^{2+}$$

When the equation is correctly balanced using the *smallest* whole-number coefficients, the coefficient of Br^- is

1) 1
2) 2
3) 3
4) 4

___ 18) The diagram below represents a voltaic cell.



In order for the cell to operate, it should be provided with

1) a salt bridge
2) an anode
3) a cathode
4) an external path for electrons

___ 19) Redox reactions are made to occur by an externally applied electrical current in a(n)

1) galvanic cell
2) electrolytic cell
3) Danielle cell
4) voltaic cell

___ 20) Which of the following is a redox reaction?

1) $2NaCl + H_2SO_4 \longrightarrow Na_2SO_4 + 2HCl$
2) $2KBr + F_2 \longrightarrow 2KF + Br_2$
3) $Ca(OH)_2 + Pb(NO_3)_2 \longrightarrow Ca(NO_3)_2 + Pb(OH)_2$
4) $2HCl + Mg(OH)_2 \longrightarrow 2HOH + MgCl_2$

___ 21) Given the reaction:

$$Mg + 2H^+ \longrightarrow Mg^{2+} + H_2$$

The reducing agent is

1) H^+
2) Mg
3) Mg^{2+}
4) H_2

___ 22) Which half-reactions occurs at the cathode in an electrolytic cell in which an object is being plated with copper?

1) $Cu^{2+} \longrightarrow Cu(s) + 2e^-$
2) $Cu(s) + 2e^- \longrightarrow Cu^{2+}$
3) $Cu(s) \longrightarrow Cu^{2+} + 2e^-$
4) $Cu^{2+} + 2e^- \longrightarrow Cu(s)$

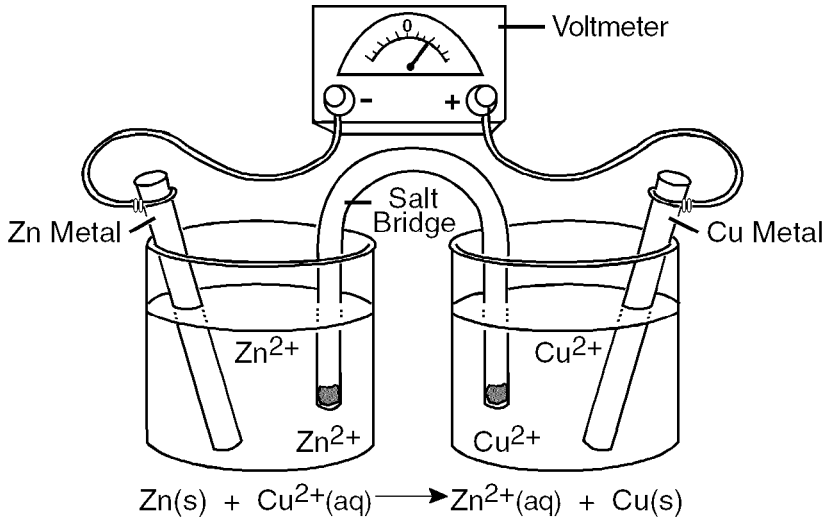
___ 23) Which quantities are conserved in *all* oxidation-reduction reactions?

1) neither charge nor mass
2) both charge and mass
3) mass, only
4) charge, only

___ 24) In the reaction $Mg + 2HCl \longrightarrow MgCl_2 + H_2$, the magnesium

1) gains electrons and is oxidized
2) loses electrons and is reduced
3) gains electrons and is reduced
4) loses electrons and is oxidized

___ 25)



When this cell operates, the electrons flow from the

1) copper half-cell to the zinc half-cell through the salt bridge
2) copper half-cell to the zinc half-cell through the wire
3) zinc half-cell to the copper half-cell through the wire
4) zinc half-cell to the copper half-cell through the salt bridge

___ 26) Given the reaction:

$$\_\_Cu(s) + \_\_HNO_3(aq) \longrightarrow \_\_Cu(NO_3)_2(aq) + \_\_NO_2(g) + \_\_H_2O(\ell)$$

When the reaction is completely balanced using the *smallest* whole numbers, the coefficient of $HNO_3(aq)$ will be

1) 1 2) 2 3) 3 4) 4