## CONCEPT REVIEW - Multiple Choice

1. Identify the oxidizing agent in the following reaction:

$$2Na + 2H_2O \rightarrow 2NaOH + H_2$$

a. Na

c. NaOH

b. H<sub>2</sub>O

 $d. H_2$ 

2. Nitrogen has the same oxidation number in all of the following except:

a. NO<sub>3</sub>

c. NH<sub>4</sub>Cl

b.  $N_2O_5$ 

d.  $Ca(NO_3)_2$ 

3. Determine what happens in this reaction:

$$S + Cl_2 \rightarrow SCl_2$$

a. Sulfur is reduced.

b. Chlorine is reduced.

c. Chlorine is oxidized.

d. Sulfur is the oxidizing agent.

4.  $Sn^{4+} \rightarrow Sn^{2+}$  represents

a. oxidation

c. hydrolysis

b. reduction

d. none of the above

5. What happens to the chlorine (in  $ClO_3^-$ ) in the following redox reaction?

$$C|O_3^- + I^- \rightarrow C|^- + I_2$$

a. It is oxidized.

b. Its oxidation number changes from +6 to -1.

c. Its oxidation number change is -6.

d. Its oxidation number change is +6.

6. Which of the following is an oxidation half-reaction?

a. 
$$Zn^{2+} + 2e^{-} \rightarrow Zn$$

c.  $H_2 \rightarrow 2H^+ + 2e^-$ 

b.  $Na^{+} + e^{-} \rightarrow Na$ 

d.  $I_2 + 2e^- \rightarrow 2I^-$ 

7. The oxidation number of sulfur in  $H_2SO_3$  is

a. +1

c. +3

b. +2

d. +4

- 8. A clean strip of copper is dipped into a solution of magnesium sulfate. Predict what you might observe using the Activity Series Reference Table.
  - a. The copper strip becomes magnesium-plated.
  - b. Copper dissolves and the solution turns blue.
  - c. No reaction occurs.
  - d. Bubbles of hydrogen gas appear on the copper.

- 9. A clean iron nail is dipped into a solution of silver nitrate. Using your knowledge of the oxidation-reduction reactions and the Activity Series Reference Table, predict which of the following will occur.
  - a. The iron will be reduced.
  - b. The iron nail will become silver-plated.
  - c. No reaction occurs.
  - d The iron will be oxidized
- 10. Which of the following is true for an electrolytic cell?
  - a. It changes electrical energy into chemical energy.
  - b. It is a type of cell used in electroplating.
  - c. It uses and electric current to make a nonspontaneous reaction to occur.
  - d. all of the above.
- 11. Which half-reaction occurs at the negative electrode in an electrolytic cell in which an object is being plated with silver?

a. 
$$Ag + e^{-} \rightarrow Ag^{+}$$

c. 
$$Aq^+ + e^- \rightarrow Aq$$

b. 
$$Ag \rightarrow Ag^{+} + e^{-}$$

d. 
$$Ag^{+} \rightarrow Ag + e^{-}$$

12. Which ion can be most easily reduced?

- 13. In an electrochemical cell (voltaic), the anode is:
  - a. the electrode at which reduction occurs.
  - b. the electrode at which electrons are produced
  - c. the positive electrode
  - d. all of the above
- 14. Which of the following is true about an electrolytic cell?
  - a. Electrons flow from the cathode to the anode in the external circuit.
  - b. Oxidation occurs at the cathode.
  - c. The redox reaction involved in such a cell is spontaneous.
  - d. All of the above.
- 15. If Al is above Co in the activity series of metals, which of the following will occur if a strip of Al is dipped into a solution of  $Co(NO_3)_2$ ?
  - a. A redox reaction takes place.
  - b. The Al strip dissolves.
  - c. The Al strip becomes coated with Co.
  - d. All of the above.

## REGENTS PRACTICE - Multiple Choice

		equal to the total number of electrons lost			
		less than the total number of electrons lost			
		greater than the total number of electrons l			
	d.	unrelated to the total number of electrons lo	ost		
17)		nich substance does sulfur have a negative oxi			
		Na <sub>2</sub> S		5	
	b.	CaSO <sub>4</sub>	d.	SO <sub>2</sub>	
18)	Whic	h of the following is a redox reaction?			
	α.	$2KBr + F_2 \rightarrow 2KF + Br_2$			
	b.	$2HCl + Mg(OH)_2 \rightarrow 2HOH + MgCl_2$			
	c.	$2NaCl + H_2SO_4 \rightarrow Na_2SO_4 + 2HCl$			
	d.	$Ca(OH)_2 + Pb(NO_3)_2 \rightarrow Ca(NO_3)_2 + Pb(OH)_2$			
19)	19) In the reaction $2K + Cl_2 \rightarrow 2KCl$ , the species oxidized is				
	a.	K	C.	Cl <sup>-</sup>	
	b.	$Cl_2$	d.	K⁺	
20)	In th	e reaction $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$ , the ox	kida	tion number of nitrogen	
	chang	ges from			
	a.	-3 to +2	c.	-2 to +3	
	b.	-3 to -2	d.	-2 to -3	
21)	Giver	n the unbalanced equation:			
•		Fe + 'Ag⁺ →Ag + Fe³⁺			
	Whe	n the equation is correctly balanced using sma		t whole number, the	
		ficient of Ag⁺ is		, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
	α.	_	c.	3	
	ь. b.			4	
	υ.	-	u.	•	
22)	What	t is the purpose of the salt bridge in a voltaic	cell	?	
,	a.			•	
		It allows electron flow.			
		It prevents ion migration.			
		It prevents electron flow.			
	u.	If prevents electron flow.			
23) According to the Activity Series chemistry reference tables, which metal can					
		ce Mg <sup>2+</sup> to Mg (s)?			
		Ва		Pb	
	b.	Fe	d.	Ag	

16) In any oxidation-reduction reaction, the total number of electrons gained is

## Redox and Electrochemistry Multiple Choice Review

24)	Whic	Which atom forms an ion that would migrate toward the cathode in an electrolytic					
	cell?						
	α.	Na	c. I				
	b.	F	d. Cl				

- 25) An electrolytic cell differs from a voltaic cell in that the electrolytic cell
  - a. uses an applied electrical current
  - b. involves redox reaction
  - c. is exothermic
  - d. produces an electric current