Chemistry 2\Chille redoxsample08

It's Electric !

Multiple Choice-choose the best answer.

TOT	+2	+12	-14	= 0
OXID #	+1	+6	-2	
	K_2	Cr_2	O_7	

1) What is the oxidation state of **Cr** in the compound, $K_2Cr_2O_7$?
1) 0 2) +3 (3) +6 4) +12 NEUTRAL COMPD

+4	-6	= -2
+4	-2	
S	O_3	

2) What is the oxidation state of **S** in the ion, SO_3^{-2} ?
1) 0 2) -2 (3) +4 4) +6 ION

1st) Grp1 = +1 & Grp 2 = +2
2nd) Grp 17, when last in formula, = -1
3rd) H = +1
4th) O = -2

BASIC DEFINITIONS

3) When an atom gets_____ it loses electrons and, as a result, its oxidation number_____.
1) oxidized, decreases 3) reduced, increases
(2) oxidized, increases 4) reduced, decreases

L.E.O. the Lion says, G.E.R.
↑ OXID # REDUCING AGENT ↓ OXID # OXIDIZING AGENT

4) In a redox reaction, the _____agent gets reduced, while the _____ agent gets oxidized.
(1) oxidizing, reducing 2) reducing, oxidizing 3) It depends on the reaction.

Atoms balance (+) and (−) ✓ TOTAL CHARGE OF REACTANTS = TOTAL CHARGE OF PRODUCTS

5) All redox reactions conserve
1) time & energy (3) mass & charge
2) electricity & gas 4) nothing; conservation doesn't apply to redox.

ex) $2Br^{-1} \rightarrow Br_2^{0} + 2e^-$

ATOMS:	2 Br	2 Br
TOTAL CHARGE:	-2	-2

6) Which of the following is a redox reaction? Must have change in oxid. no. of 2 species

1) $\overset{+1\ -1}{HCl} + \overset{+1\ -2\ +1}{NaOH} \rightarrow \overset{+1\ -1}{NaCl} + \overset{+1\ -2}{H_2O}$

2) $\overset{+1\ -1}{AgCl} + 2\,\overset{-3\ +1}{NH_3} \rightarrow \overset{+1\ -3\ +1}{Ag(NH_3)_2^+} + \overset{-1}{Cl^-}$

(3) $2\,\overset{+1\ -2}{H_2O} \rightarrow 2\,\overset{0}{H_2} + \overset{0}{O_2}$ HINT: Look for free element on either side of Equation

4) $\overset{+2\ +6\ -2}{CuSO_4} + 5\,\overset{+1\ -2}{H_2O} \rightarrow \overset{+2\ +6\ -2}{CuSO_4} \cdot 5\,\overset{+1\ -2}{H_2O}$

Answer questions 7-9 using **Table J**.

7) Which of the following is the strongest reducing agent? gets oxidized, loses e-
1) Pb 2) Ni 3) Fe (4) Zn
Most active metal

8) Which of the following is the strongest oxidizing agent? gets reduced, gains e-
(1) F_2 2) Cl_2 3) Br_2 4) I_2
Most active non-metal

9) Which of the following pairs will react spontaneously? "ON ITS OWN"

1) Fe + $ZnSO_4$ 2) Na + $BaCl_2$ 3) Sr + $Ni(NO_3)_2$ 4) I_2 + NaF

More active METAL Less active METAL

Answer questions 10-13 based on the following equation:

$$Ca^{0} + Zn^{+2}SO_4^{-2} \rightarrow Zn^{0} + Ca^{+2}SO_4^{-2}$$

NOTE: SO_4^{-2} IS A SPECTATOR ION

10) The species oxidized is (1) Ca 2) Zn^{+2} 3) Zn 4) Ca^{+2}

OXID # ↑

11) The oxidizing agent is 1) Ca (2) Zn^{+2} 3) Zn 4) Ca^{+2}

Gets reduced, OXID # ↓

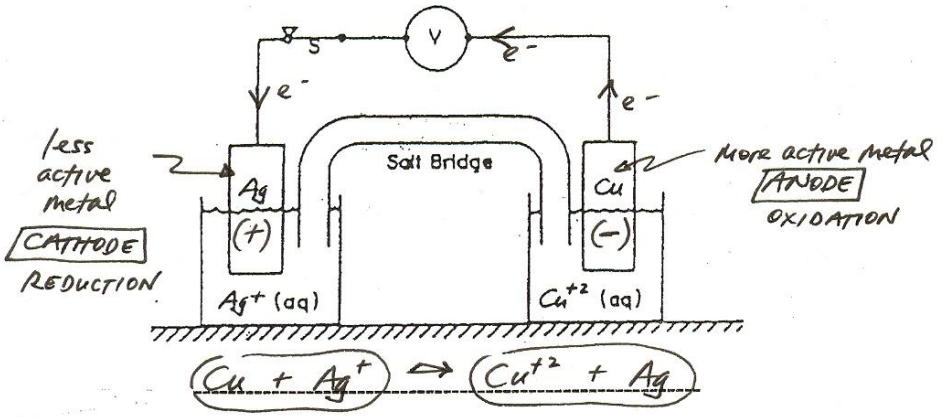
12) The correct oxidation half reaction is

1) $Zn^{+2} + 2e^- \rightarrow Zn$ (3) $Ca \rightarrow Ca^{+2} + 2e^-$ } L.E.O. OXIDATION IS LOSS OF e-

2) $Zn \rightarrow Zn^{+2} + 2e^-$ 4) $Ca^{+2} + 2e^- \rightarrow Ca$

13) The moles of electrons transferred is 1) 1 (2) 2 3) 3 4) 4

Refer to the diagram below to answer questions 14-17.



14) The best description of this diagram is
1) an electrolytic cell (3) a Voltaic cell – "making" Electricity
2) electrolysis 4) electroplating

15) When the switch is closed, in which direction do the electrons flow? aka "GALVANIC" CELL

1) Ag to Cu (2) Cu to Ag 3) Ag to Ag^+ 4) Cu^{+2} to Cu

16) What takes place at the negative (-) electrode?

(1) oxidation 3) oxidation & reduction
2) reduction 4) neither oxidation nor reduction

17) As time passes, what happens to the [Ag^+] ? 1) increases 2) decreases 3) remains the same

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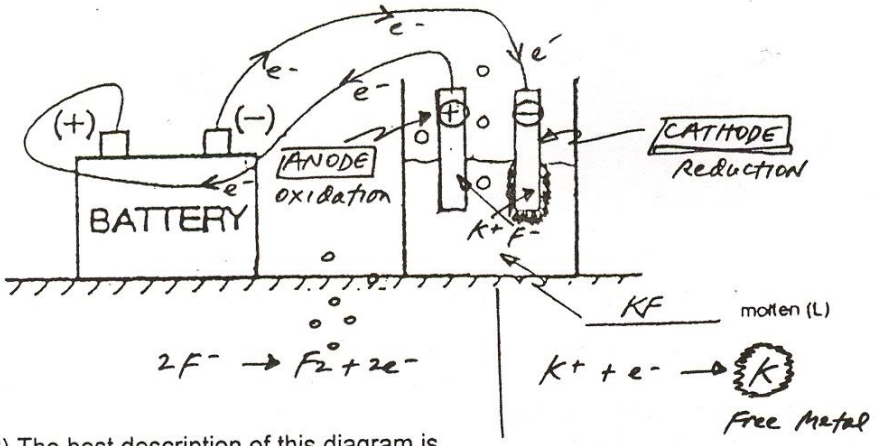
$Cu + Ag^+ \rightarrow Cu^{+2} + Ag$

REACTANTS ↓ PRODUCTS ↑

Refer to the diagram below to answer questions 18-21.



NOTE In an Electrolytic Cell the ANODE & CATHODE signs are reversed. (Opposite to Voltaic Cell)

18) The best description of this diagram is

1) a battery
2) electrolysis
3) a Galvanic cell
4) electroplating

19) The reaction that takes place is

1) spontaneous
2) non-spontaneous (using Electricity)
3) at equilibrium

20) What takes place at the positive (+) electrode?

1) oxidation
2) reduction
3) oxidation & reduction
4) neither oxidation nor reduction

21) What is the identity of the substance that plates the negative (-) electrode?

1) potassium metal
2) potassium ion
3) fluoride ion
4) fluorine gas

Nitric acid reacts with copper metal ~~according to the~~ following chemical equation:

$$4H^+ + 2NO_3^- + Cu \rightarrow Cu^{+2} + 2NO_2 + 2H_2O$$

(+5, −2) (0) (+2) (+4, −2) (+1, −2)

REDUCED OXIDIZED

Answer questions 22- 25 based on this reaction.

22) What is unusual about this reaction?

1) The production of water.
2) Mass isn't conserved.
3) An acid is behaving as an oxidizing agent.
4) The change in nitrogen's oxidation state.

23) Which is the species undergoing oxidation?

1) H^+
2) NO_3^-
3) Cu
4) Cu^{+2}

24) What is the correct half reaction corresponding to the reduction that occurs?

1) $N^{+5} \rightarrow N^{+6} + e^-$
2) $N^{+5} + e^- \rightarrow N^{+4}$ } G.E.R. (REDUCTION IS GAIN e⁻)
3) $Cu + 2e^- \rightarrow Cu^{-2}$
4) $Cu \rightarrow Cu^{+2} + 2e^-$

25) Which species shows no change in oxidation state?

1) H^+
2) NO_3^-
3) Cu
4) Cu^{+2}