HW07- RedOx, E-chem intro

1 1.5 points

In the decomposition of cobalt (II) chloride, what substance is being oxidized?
$CoCl_2$ (s) → Co (s) + Cl_2 (g)

- Co
- $CoCl_2$
- Cl

2 1.5 points

Balance the skeletal equation of hydrazine with chlorate ions, shown below:
$N_2H_4(g) + ClO_3^-(aq) \longrightarrow NO(g) + Cl^-(aq)$
The reaction takes place in basic solution. What is the smallest possible integer coefficient of ClO_3^- in the balanced equation?

- 1
- 2
- 6
- 4
- 3

3 1.5 points

Identify the reducing agent in the reaction in question 2.

- ClO_3^-
- NO
- Cl^-
- N_2H_4

4 1.5 points

In the reaction between lead (II) sulfide and oxygen gas, what is the oxidizing agent?
PbS (s) + $2O_2$ (g) → SO_2 (g) + PbO_2 (s)

- O_2
- S
- Pb
- PbS
- O

5 1.5 points

In the reaction of thiosulfate ion with chlorine gas in an acidic solution, what is the reducing agent?
$Cl_2(g) + S_2O_3^{2-}(aq) \longrightarrow Cl^-(aq) + SO_4^{2-}(aq)$

- $S_2O_3^{2-}$
- Cl
- S^{2+}
- Cl_2

6 1.5 points

Balance the reaction in question 5 using oxidation and reduction half-reactions. What is the smallest possible integer coefficient of SO_4^{2-} in the combined balanced equation?

- 2
- 1
- 4
- 3

7 1.5 points

Based on the following reaction, answer the next 2 questions:
$2Fe^{2+}(aq) + H_2O_2(aq) \rightarrow 2Fe^{3+}(aq) + 2OH^-(aq)$
Which species is the oxidizing agent?

- H_2O_2
- Fe^{3+}
- OH^-
- H
- Fe^{2+}
- O

8 1.5 points

Using the same reaction as the previous problem, how many electrons were transferred as it is balanced?

- 0
- 2
- 1
- 6
- 5
- 4
- 3

9 1.5 points

Balance the following reaction in basic conditions:
$PbO_2(aq) + NO_2^-(aq) \rightarrow Pb^{2+}(aq) + NO_3^-(aq)$
What is the coefficient of water? Is it a product or a reactant?

- 4, product
- 4, reactant
- 2, reactant
- 1, product
- 2 product
- 1, reactant

10 1.5 points

Balance the following reaction in acidic conditions and answer the next three questions:
$FeO(aq) + V_2O_5(aq) \rightarrow Fe_2O_3(aq) + VO(aq)$
How many total electrons are transferred in this reaction?

- 2
- 5
- 6
- 3

11 1.5 points

Using the same reaction as the previous problem, what was the oxidation state of V in V_2O_5?

- 5
- 2
- 10
- 6

12 1.5 points

Using the same reaction from question 10, what is the reducing agent?

- FeO
- V_2O_5
- V
- Fe
- O

13 1.5 points

Balance the following reaction in basic conditions and answer the following questions:
$Ca^{2+}(aq) + C(s) + ClO_2^-(g) \rightarrow CaCO_3(s) + ClO_3^-(aq)$
What is the oxidation state of C in $CaCO_3(s)$?

- -2
- +4
- +2
- 0
- -4

14 1.5 points

Using the reaction from the previous problem, what is the coefficient on water? Is it a product or reactant?

- 1, product
- 1, reactant
- 3, product
- 6, product
- 6, reactant
- 3, reactant

15 1.5 points

Using the same reaction from question 13, what is the total number of electrons transferred?

- 1
- 6
- 2
- 4

16 1.5 points

Silver is plated on copper by immersing a piece of copper into a solution containing silver (I) ions. In the plating reaction, copper...

- is reduced and is the reducing agent.
- is oxidized and is the reducing agent.
- is oxidized and is the oxidizing agent.
- is reduced and is the oxidizing agent.

17 1.5 points

In an electrolytic cell, the negative terminal is the (cathode/anode) and is the site of the (oxidation/reduction) half-reaction.

- anode, reduction
- cathode, reduction
- anode, oxidation
- cathode, oxidation

18 1.5 points

Consider the cell reaction represented by the skeletal equation:
$Mn(s) + Ti^{2+}(aq) \longrightarrow Mn^{2+}(aq) + Ti(s)$
What is the proper shorthand notation for this reaction?

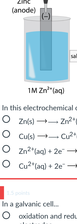
- $Mn^{2+}(aq)$ | Mn(s) || Ti(s) | $Ti^{2+}(aq)$
- Mn(s) | $Mn^{2+}(aq)$ || $Ti^{2+}(aq)$ | Ti(s)
- Ti(s) | $Ti^{2+}(aq)$ || $Mn^{2+}(aq)$ | Mn(s)
- $Ti^{2+}(aq)$ | Ti(s) || Mn(s) | $Mn^{2+}(aq)$

19 1.5 points

In a working electrochemical cell (a galvanic cell or a battery), the cations in the salt bridge move toward the cathode.

- It is impossible to tell unless we know if the cathode is "+" or "-".
- True
- False
- It depends on the charge of the cation.

20 2 points



In this electrochemical cell, what is the reduction half reaction?

- $Zn(s) \longrightarrow Zn^{2+}(aq) + 2e^-$
- $Cu(s) \longrightarrow Cu^{2+}(aq) + 2e^-$
- $Zn^{2+}(aq) + 2e^- \longrightarrow Zn(s)$
- $Cu^{2+}(aq) + 2e^- \longrightarrow Cu(s)$

21 1.5 points

In a galvanic cell...

- oxidation and reduction take place at the same time, but at different electrodes
- electrical energy is used to reverse spontaneous chemical reactions
- oxidation takes place at the cathode
- electrolytes are added to carry electrons between electrodes