

Redox Practice (Spontaneity)

Multiple Choice - circle the best response

1. Using the table of standard reduction potentials, it can be predicted that I^- will react spontaneously with

A. Co

B. Br_2

C. Cl^-

D. Cu^{2+}

2. Which of the following is the strongest oxidizing agent?

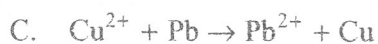
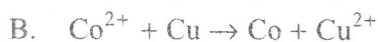
A. Cu^{2+}

B. Pb^{2+}

C. Ni^{2+}

D. Sn^{2+}

3. Which of the following reactions is spontaneous?



4. A student wants to determine the $[Sn^{2+}]$ in a solution of $SnCl_2$ by a redox titration. A suitable ion to use would be

A. Br^-

B. Cr^{3+}

C. Pb^{2+}

D. MnO_4^-

5. Which of the following chemical species is capable of oxidizing silver?

A. F^-

B. K^+

C. Br_2

D. Mg

6. Which of the following could react spontaneously with Ag metal?

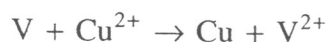
A. Cl^-

B. Fe^{2+}

C. acidified SO_4^{2-}

D. acidified NO_3^-

7. Solid copper forms spontaneously in the following reaction:



Based on this observation, Cu^{2+} is a

A. weaker reducing agent than V^{2+}

B. weaker oxidizing agent than V^{2+}

C. stronger reducing agent than V^{2+}

D. stronger oxidizing agent than V^{2+}

8. A piece of zinc metal is dropped into a solution of $FeCl_2$. The result of this procedure is

A. no reaction

B. the zinc is oxidized by Cl_2

C. the iron is oxidized by Zn^{2+}

D. the zinc is oxidized by Fe^{2+}

9. A piece of Au does not react spontaneously with 1.0 M HCl.
Which of the following statements is true?

- A. Au is a weaker reducing agent than H_2
- B. Au is a stronger reducing agent than H_2
- C. Au is a weaker oxidizing agent than H^+
- D. Au is a stronger oxidizing agent than H^+

10. Vanadium metal, V, reacts spontaneously with Cd^{2+} , but not with Ti^{2+} . Based on these results, the order of oxidizing agents, from strongest to weakest, is

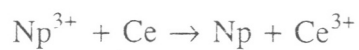
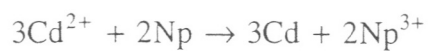
- A. Cd^{2+} , V^{2+} , Ti^{2+}
- B. V^{2+} , Ti^{2+} , Cd^{2+}
- C. Ti^{2+} , Cd^{2+} , V^{2+}
- D. Ti^{2+} , V^{2+} , Cd^{2+}

11. A solution of $Ag(NO_3)_2$ (an unusual form of silver) reacts with gold metal while a solution of $AgNO_3$ does not react with gold. What is the order of oxidizing agents when arranged from strongest to weakest?

- A. Ag^+ , Au^{3+} , Ag^{2+}
- B. Au^{3+} , Ag^{2+} , Ag^+
- C. Ag^{2+} , Au^{3+} , Ag^+
- D. Ag^{2+} , Ag^+ , Au^{3+}

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Consider the following spontaneous reactions:



Which is the strongest oxidizing agent?

- A. Cd^{2+}
- B. Ce^{3+}
- C. Np^{3+}
- D. Pd^{2+}

13.

The metals Hg, Cd, Ga and Pd react as follows:



Which of the following metals is the strongest reducing agent?

- A. Pd
- B. Ga
- C. Cd
- D. Hg

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When a piece of Cu is placed in 1.0 M AgNO_3 ,

- A. the $[\text{Ag}^+]$ increases.
- B. the $[\text{Cu}^{2+}]$ increases.
- C. the $[\text{NO}_3^-]$ decreases.
- D. no change occurs.

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What two substances are produced when Cr and 1.0 M MnO_4^- react in **basic** solution?

- A. Mn^{2+} and Cr^{3+}
- B. MnO_2 and Cr^{3+}
- C. Mn^{2+} and Cr^{2+}
- D. MnO_2 and CrO_4^{2-}

Short Answer - write your response in the space provided. Express your answer in correct sig figs & units where appropriate.

1. An excess of copper solid is dropped into a solution which contains AgNO_3 , $\text{Fe}(\text{NO}_3)_3$ and $\text{Zn}(\text{NO}_3)_2$. Write the equations for any reduction half-reactions that occur over time under standard conditions.

(2 marks)

2.

- a) Indicate in the blank spaces on the following chart whether or not a reaction will occur when the metals are added to aqueous ions. **(1 mark)**

metal ion	Pd	Rh	Pt
Pd^{2+}			
Rh^{2+}	no reaction		no reaction
Pt^{2+}	reaction	reaction	

- b) List the oxidizing agents in order of strongest to weakest.

(1 mark)