

Redox Multiple Choice Provincial Practice

1. Identify the substance that is oxidized in the following equation:



- A. Br_2
 B. SO_2
 C. H_2O
 D. Na_2SO_4

- A. 1
 B. 2
 C. 3
 D. 4

2. What is the oxidation number of C in the $\text{C}_3\text{H}_5\text{O}_2^-$ ion?

- A. $-\frac{1}{3}$
 B. $-\frac{2}{3}$
 C. -1
 D. -2

- A. 1
 B. 2
 C. 3
 D. 4

3. How does the oxidation number change for O if Na_2O_2 is converted to Na and O_2 ?

- A. decreases by 1
 B. no change
 C. increases by 1
 D. increases by 2

- A. 1
 B. 2
 C. 3
 D. 4

4.

1	$2\text{H}_2\text{SO}_3 + 2\text{H}^+ + 4\text{e}^- \rightarrow \text{S}_2\text{O}_3^{2-} + 3\text{H}_2\text{O}$
2	$\text{SnCl}_6^{2-} + 2\text{e}^- \rightarrow \text{Sn}^{2+} + 6\text{Cl}^-$
3	$\frac{1}{2}\text{Hg}_2^{2+} + \text{e}^- \rightarrow \text{Hg}(\ell)$
4	$\text{Sb}_2\text{O}_3 + 6\text{H}^+ + 4\text{e}^- \rightarrow 2\text{Sb}(\text{OH})_2^+ + \text{H}_2\text{O}$

A redox reaction occurs when Sb_2O_3 is mixed with $\text{S}_2\text{O}_3^{2-}$, but no reaction occurs when Sb_2O_3 is mixed with Hg. A solution of SnCl_6^{2-} has no effect on $\text{S}_2\text{O}_3^{2-}$. Which of the following describes the order of the half-reaction reduction potentials from highest to lowest?

- A. $2 > 1 > 4 > 3$
 B. $2 > 4 > 1 > 3$
 C. $3 > 1 > 4 > 2$
 D. $3 > 4 > 1 > 2$

- A. 1
 B. 2
 C. 3
 D. 4

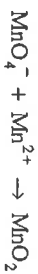
5. A solution of $\text{Ag}(\text{NO}_3)_2$ (an unusual form of silver) reacts with gold metal while a solution of AgNO_3 does not react with gold. What is the order of oxidizing agents when arranged from strongest to weakest?

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

- A. 1
- B. 2
- C. 3
- D. 4

6.

Consider the following skeletal redox reaction in basic solution:



Which of the following is the reduction half-reaction?

- A. $2e^- + 4\text{OH}^- + \text{Mn}^{2+} \rightarrow \text{MnO}_2 + 2\text{H}_2\text{O}$
- B. $4\text{OH}^- + \text{Mn}^{2+} \rightarrow \text{MnO}_2 + 2\text{H}_2\text{O} + 2e^-$
- C. $3e^- + 2\text{H}_2\text{O} + \text{MnO}_4^- \rightarrow \text{MnO}_2 + 4\text{OH}^-$
- D. $4e^- + 2\text{H}_2\text{O} + \text{MnO}_4^- \rightarrow \text{MnO}_2 + 4\text{OH}^-$

- A. 1
- B. 2
- C. 4
- D. 5

7.

If $\text{Fe}^{3+}(\text{aq})$ and $\text{Cl}^-(\text{aq})$ are mixed, $\text{FeCl}_3(\text{aq})$ results. However, if $\text{Fe}^{3+}(\text{aq})$ and $\text{I}^-(\text{aq})$ are mixed, $\text{FeI}_3(\text{aq})$ does not result. Which of the following best describes why?

- A. FeI_3 is soluble.
- B. I^- is oxidized in the solution.
- C. Fe^{3+} forms an acidic solution.
- D. Fe^{3+} is too strong a reducing agent.

- A. 1
- B. 2
- C. 3
- D. 4

8.

Which of the following best describes what happens when lead solid is placed in a 1.0M solution of $\text{Cu}(\text{NO}_3)_2$?

- A. Bubbles form on the lead.
- B. No changes are observed.
- C. Copper solid forms on the lead and the solution changes colour.
- D. The mass of lead solid increases and the solution does not change colour.

- A. 1
- B. 2
- C. 3
- D. 4

9.

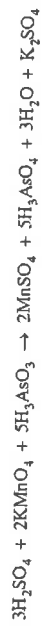
A redox titration is carried out by adding purple KMnO_4 solution from a burette to a solution of H_2O_2 in a flask, under acidic conditions. Which of the following would correctly describe the observed colour and the product formed in the flask before the equivalence point is reached?

	Observed Colour	Product Formed
A.	remains purple	H_2
B.	remains purple	O_2
C.	becomes colourless	H_2
D.	becomes colourless	O_2

- A. 1
B. 2
C. 3
D. 4

10.

Pure H_3AsO_3 solid can be used to standardize a KMnO_4 solution using a redox titration as follows:



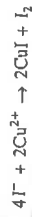
A 0.200 g sample of H_3AsO_3 was titrated with 14.6 mL of KMnO_4 solution.
What is the molarity of the KMnO_4 solution?

- A. 0.0435 M
B. 0.109 M
C. 0.272 M
D. 5.48 M

- A. 1
B. 2
C. 3
D. 4

11.

A 0.108 g sample of impure NaI is analyzed by titration with 0.0100 M CuSO_4 solution according to the following equation:

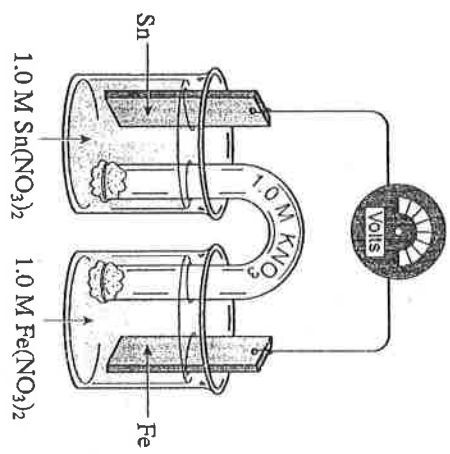


How many moles of NaI are present in the sample if the titration requires 29.4 mL of CuSO_4 solution?

- A. 7.20×10^{-4} mol
B. 5.88×10^{-4} mol
C. 2.94×10^{-4} mol
D. 8.81×10^{-2} mol

- A. 1
B. 2
C. 3
D. 4

12.

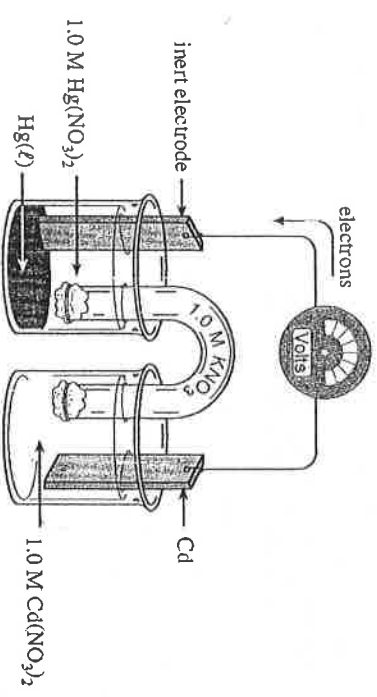


What is the cathode half-cell reaction?

- A. $\text{Sn}^{2+} + 2e^- \rightarrow \text{Sn}$
- B. $\text{Fe}^{2+} + 2e^- \rightarrow \text{Fe}$
- C. $\text{Fe}^{2+} + e^- \rightarrow \text{Fe}^{3+}$
- D. $\text{Sn}^{2+} + 2e^- \rightarrow \text{Sn}^{4+}$

- A. 1
- B. 2
- C. 3
- D. 4

13.

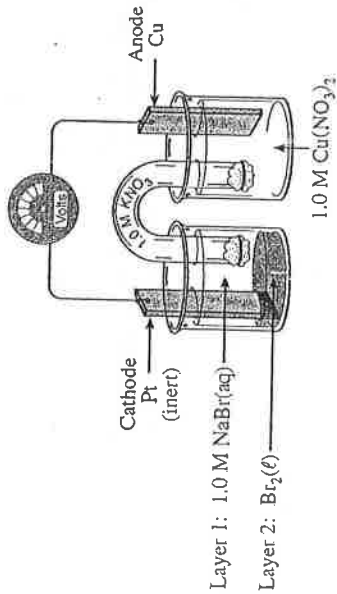


If the standard cell voltage is 1.25 V, what is the reduction half-cell potential for Cd?

- A. -0.40 V
- B. +0.40 V
- C. +1.25 V
- D. +2.10 V

- A. 1
- B. 2
- C. 3
- D. 4

14.



Which of the following best describes the movement of potassium ions and electrons as the cell operates?

K ⁺ Ion Movement	Electron Movement
towards the Cu	towards the Pt
towards the Cu	towards the Cu
towards the Pt	towards the Cu
towards the Pt	towards the Pt

- A. 1
 B. 2
 C. 3
 D. 4

15.

A student constructs three standard electrochemical cells using the metals Pd, Cd and Ga with 1.0M solutions of their ions. The student then records the voltages of Cell 1 and Cell 2 in the following table.

Cell	Anode	Cathode	Voltage
1	Ga	Pd	+1.18 V
2	Ga	Cd	+0.16 V
3	Cd	Pd	?

What voltage should Cell 3 produce?

- A. -1.34 V
 B. -1.02 V
 C. +1.02 V
 D. +1.34 V

- A. 1
 B. 2
 C. 3
 D. 4

16.

As a standard Zn-Ni electrochemical cell is allowed to reach equilibrium, several changes take place. Which of the following best describes the typical changes which occur?

Cell Voltage	
drops to zero	equals the [Zn ²⁺]
drops to zero	decreases to a low value
drops to some low but non-zero value	equals the [Zn ²⁺]
changes from positive to negative	decreases to zero

- A. 1
 B. 2
 C. 3
 D. 4

17. An iron pipeline can be protected from rusting by connecting it to a

- A. zinc nitrate solution.
- B. silver nitrate solution.
- C. zinc electrode buried beside the pipeline.
- D. silver electrode buried beside the pipeline.

- A. 1
- B. 2
- C. 3
- D. 4

18.

Which of the following would prevent the corrosion of an iron nail?

- A. Store the nail in $\text{Cl}_2(\text{g})$.
- B. Store the nail in dry air.
- C. Store the nail in a beaker of distilled water.
- D. Store the nail wrapped in cobalt wire in a beaker of distilled water.

- A. 1
- B. 2
- C. 3
- D. 4

19. What products result from the electrolysis of molten KBr ?

Product at the Cathode	Product at the Anode
A. K	O_2
B. K	Br_2
C. O_2	H_2
D. Br_2	K

- A. 1
- B. 2
- C. 3
- D. 4

20.

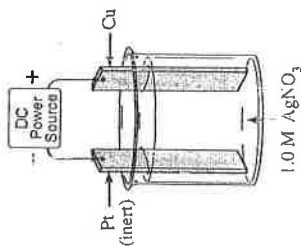
Which of the following species is consumed during the electrolysis of aqueous CuSO_4 when using a copper cathode and a carbon anode?

- A. O_2
- B. Cu
- C. Cu^{2+}
- D. SO_4^{2-}

- A. 1
- B. 2
- C. 3
- D. 4

21.

Consider the electrolytic cell shown in the following diagram:



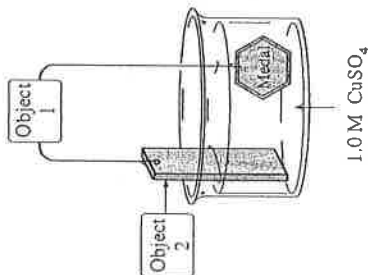
Which of the following describes the anion movement and electrode masses for the above cell?

Anion Movement	Mass of Pt Electrode	Mass of Cu Electrode
to the Cu	increases	increases
to the Cu	increases	decreases
to the Pt	decreases	increases
to the Pt	decreases	decreases

- A. 1
 B. 2
 C. 3
 D. 4

22.

A student brought an old silver medal to the Chemistry Lab to plate it with copper. He set up a cell like the one in the following diagram:



Which of the following combinations should produce the best result?

Object 1	Electron Flow	Object 2
A. AC power supply	towards the medal	Ag
B. DC power supply	towards the medal	copper
C. DC power supply	from the medal	copper
D. voltmeter	from the medal	Pt

- A. 1
 B. 2
 C. 3
 D. 4

