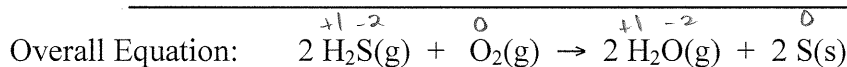
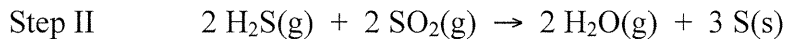
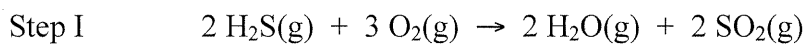


## Chemistry 30

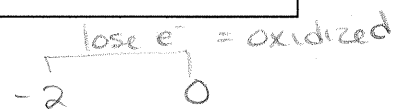
### Electrochemistry Review

*Use the following information to answer the next question.*

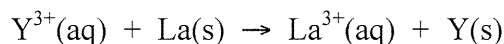
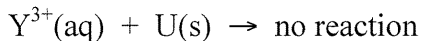
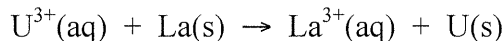
At the Wascana Gas Plant in Balzac, Alberta, environmental and economic concerns have resulted in the development of an efficient process for the removal of sulphur from sour gas, which is a mixture of hydrocarbons and  $\text{H}_2\text{S}_{(g)}$ . In the first step of the process, one-third of the  $\text{H}_2\text{S}_{(g)}$  reacts with  $\text{O}_{2(g)}$  to produce  $\text{SO}_{2(g)}$ . In the second step of the process, the  $\text{SO}_{2(g)}$  produced reacts with the remaining  $\text{H}_2\text{S}_{(g)}$  to form elemental sulphur and water.



1. As  $\text{H}_2\text{S}_{(g)}$  forms  $\text{S}_{(s)}$ , the oxidation number of sulphur
- A. changes from 0 to ~~-2~~ and sulphur is reduced
- B.** changes from -2 to 0 and sulphur is oxidized
- C. decreases by ~~2~~ and hydrogen sulphide acts as the reducing agent
- D. stays the same because the sulphur is neither oxidized nor reduced ~~X~~

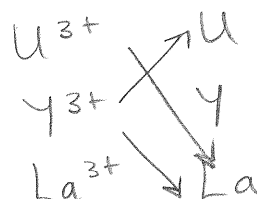


*Use the following information to answer the next question.*



2. The oxidizing agents above, listed from strongest to weakest, are
- A.  $\text{U}^{3+}(\text{aq})$ ,  $\text{La}^{3+}(\text{aq})$ ,  $\text{Y}^{3+}(\text{aq})$
- B.**  $\text{U}^{3+}(\text{aq})$ ,  $\text{Y}^{3+}(\text{aq})$ ,  $\text{La}^{3+}(\text{aq})$
- C.  $\text{Y}^{3+}(\text{aq})$ ,  $\text{U}^{3+}(\text{aq})$ ,  $\text{La}^{3+}(\text{aq})$
- D.  $\text{U}(\text{s})$ ,  $\text{Y}(\text{s})$ ,  $\text{La}(\text{s})$  ~~X~~

SOA



Use the following information to answer the next question.

A farmer noticed a white substance around the scratches on his zinc-coated steel grain bins. His daughter, who had just completed Chemistry 30, correctly told him that the zinc was being oxidized.

3. In the process of being oxidized, the zinc
- A. gained electrons to produce more Zn(s)
  - B. lost electrons and became Zn<sup>2+</sup>(aq)
  - C. gained protons to produce Zn<sup>2+</sup>(aq)
  - D. lost protons and became Zn(s)



4. The oxidation number of chromium in Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>(s) is

- A. +6
- B. +18
- C. +1
- D. +3

$$\begin{aligned} & \overset{+1}{\text{Na}_2} + \overset{-2}{\text{Cr}_2\text{O}_7} = 0 \\ & (+2) + 3(x) + (-20) = 0 \\ & 3x = 18 \\ & \frac{3x}{3} = \frac{18}{3} \\ & x = 6 \end{aligned}$$

Use the following information to answer the next question.

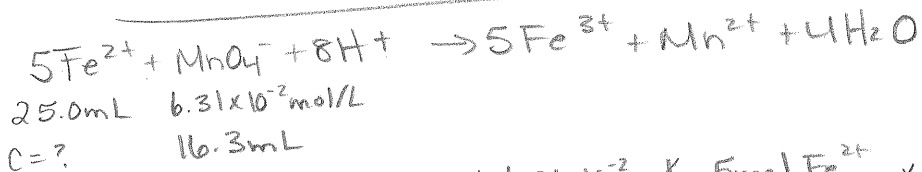
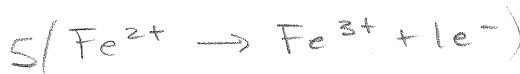
A student used an acidified  $6.31 \times 10^{-2}$  mol/L KMnO<sub>4</sub>(aq) solution to titrate 25.0 mL samples of Fe<sup>2+</sup>(aq) solution of unknown concentration. In the reactions, the Fe<sup>2+</sup>(aq) ion was oxidized to the Fe<sup>3+</sup>(aq) ion. The student completed five trials and summarized the data in a table.

Trial Number	1	2	3	4	5
Final Buret Reading (mL)	17.55	35.65	26.40	42.65	16.85
Initial Buret Reading (mL)	0.30	17.55	10.05	26.40	0.55
Final Colour	purple	purple	pink	pink	pink

$$\frac{17.25 + 18.1 + (16.35 + 16.25 + 16.3)}{3} = 16.3 \text{ mL}$$

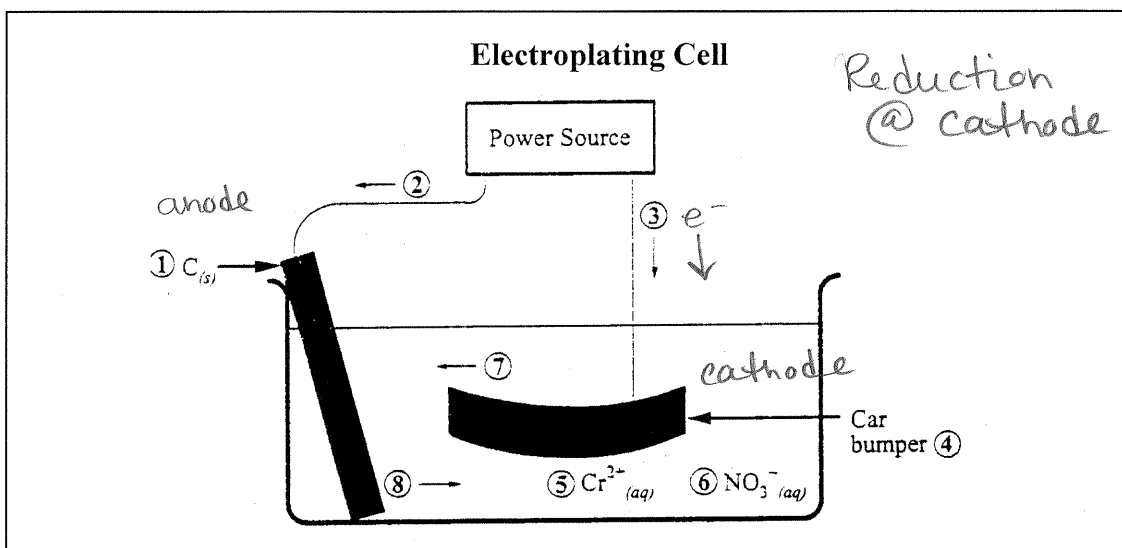
5. According to the student's data, the concentration of Fe<sup>2+</sup>(aq) is

- A. 0.206 mol/L
- B. 0.218 mol/L
- C. 0.213 mol/L
- D. 0.223 mol/L



$$2 \quad 16.3 \text{ mL} \times \frac{6.31 \times 10^{-2} \text{ mol/L}}{1 \text{ mol MnO}_4^{-}} \times \frac{5 \text{ mol Fe}^{2+}}{1 \text{ mol MnO}_4^{-}} \times \frac{1}{25.0 \text{ mL}} = 0.2057 = 0.206 \text{ mol/L}$$

Use the following information to answer the next question.



**Numerical Response**

1. Use the numbers that identify the parts of the electroplating cell in the diagram above to complete the statements below.

- The cathode is identified by 4 (Record in the **first** column)
- The electron movement is identified by 3 (Record in the **second** column)
- The cation movement is identified by 8 (Record in the **third** column)
- The anion is identified by 6 (Record in the **fourth** column)

(Record your answer in the numerical-response section on the answer sheet)

Use the following information to answer the next question.

The following are materials used by Chemistry 30 students in laboratory work.

① electrodes	⑤ thermometer
② insulated containers	⑥ electrolytes
③ pH paper	⑦ external circuit
④ porous boundary	⑧ buret

**Numerical Response**

2. The materials necessary to construct and operational voltaic cell are, in numerical order, 1, 4, 6, and 7.

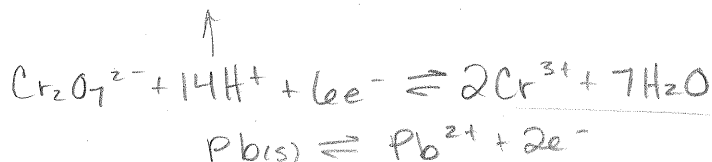
(Record your **four-digit answer** in the numerical-response section on the answer sheet)

Use the following information to answer the next three questions.

Restorers of antique cars often refinish chrome-plated parts by electroplating them. The part is attached to one electrode of an electrolytic cell in which the other electrode is lead. The electrolyte is a solution of dichromic acid,  $\text{H}_2\text{Cr}_2\text{O}_7(\text{aq})$ .

6. The plating of chromium metal will take place at the

- A. anode where oxidation occurs
- B. anode where reduction occurs
- C. cathode where oxidation occurs
- D. cathode where reduction occurs**

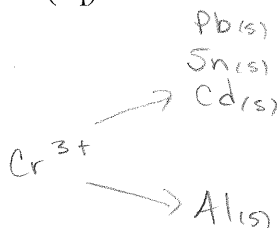


7. During the operation of this cell,

- A.  $\text{Pb}(s)$  is reduced
- B.  $\text{H}_2\text{Cr}_2\text{O}_7(\text{aq})$  is oxidized
- C. the pH of the solution increases**
- D. the total energy of the system decreases

8. A metal that will react spontaneously with  $\text{Cr}^{3+}(\text{aq})$  in a chromium-plating solution is

- A. aluminum**
- B. cadmium
- C. lead
- D. tin



9. The voltage of an electrochemical cell is +0.20 V. If one of the half-reactions is the reduction of  $\text{Cu}^{2+}(\text{aq})$ , then the other half-reaction that occurs could be

- A.  $2\text{I}^-(\text{aq}) \rightarrow \text{I}_2(\text{s}) + 2e^-$
- B.  $\text{S}(\text{s}) + 2\text{H}^+(\text{aq}) + 2e^- \rightarrow \text{H}_2\text{S}(\text{aq})$**
- C.  $\text{H}_2\text{S}(\text{aq}) \rightarrow \text{S}(\text{s}) + 2\text{H}^+(\text{aq}) + 2e^-$
- D.  $\text{I}_2(\text{s}) + 2e^- \rightarrow 2\text{I}^-(\text{aq})$

$$E^\circ_{\text{cell}} = E^\circ_{\text{cathode}} - E^\circ_{\text{anode}}$$

$$+0.20 = +0.34 - x$$

$$x = 0.14\text{V}$$

Use the following information to answer the next question.

A chromium electroplating cell needs to operate at a current of 2000 A to plate 112 g of chromium onto a car bumper.



**Numerical Response**

3. In order to plate the bumper, the number of moles of chromium(II) ions that must react in the cell is 2.15 mol.

(Record your **three-digit answer** in the numerical-response section on the answer sheet)

$$112\text{g Cr} \times \frac{\text{mol}}{52.00\text{g}} \times \frac{1\text{mol Cr}^{2+}}{1\text{mol Cr(s)}} = 2.15\text{ mol}$$

Use your recorded answer for **Numerical Response 3** to answer **Numerical Response 4\***.

**Numerical Response**

4. In order to plate the bumper, the cell must operate for 3.46 min.

(Record your **three-digit answer** in the numerical-response section on the answer sheet)

\*You can still receive marks for this question even if the previous question was answered incorrectly.

$$112\text{g Cr} \times \frac{\text{mol}}{52.00\text{g}} \times \frac{2\text{mole}^{-}}{1\text{mol Cr(s)}} \times \frac{9.65 \times 10^4\text{C}}{\text{mole}^{-}} \times \frac{\text{s}}{2000\text{C}} \times \frac{\text{min}}{60\text{s}} = 3.46\text{min}$$

Use the following information to answer the next question.

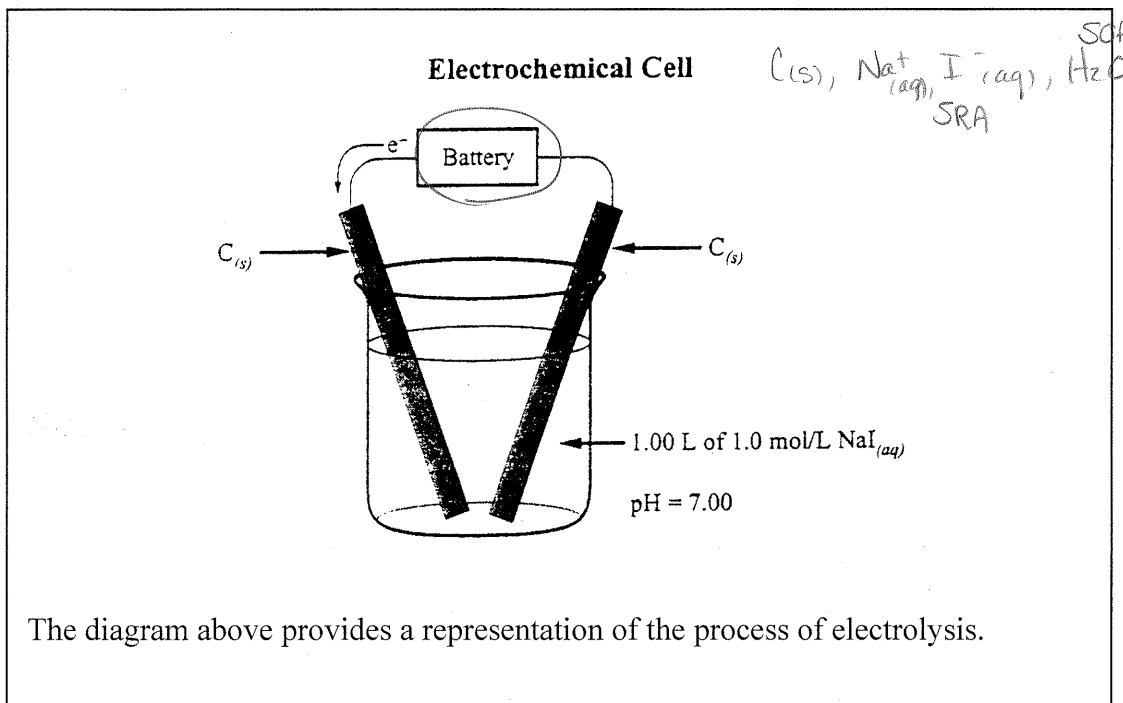
Some car manufacturers have designed an anticorrosion system that sends a weak electric current from the battery to the frame of the car. The current provides a source of electrons, which reduces corrosion of the steel frame.

10. Which of the following methods could **not** be used as an alternative to the method of corrosion prevention described above?

- A. Galvanize the steel frame with zinc. ✓
- B. Coat the steel frame with inert plastic polymers. ✓
- C. Use a paint that prevents contact of the steel frame with the environment. ✓
- D. Bolt sacrificial anodes made of copper to the steel frame.

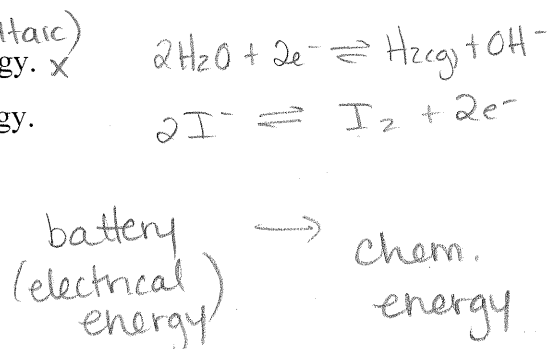
↑ would not be a SRA than the steel frame  
∴ wouldn't act as a sacrificial anode

Use the following information to answer the next question.

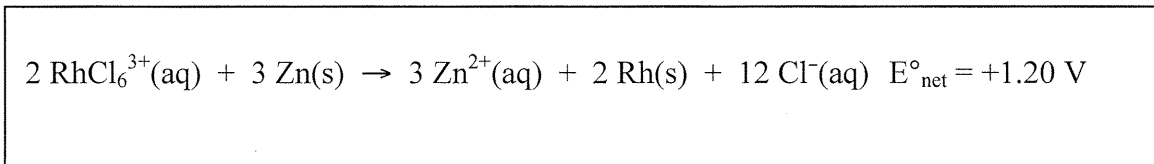


11. Which of the following statements describes what happens during the operation of this cell?

- A. Chemical energy is converted to electrical energy. ~~x~~ (voltaic)
- B. Electrical energy is converted to chemical energy.**
- C. Electrons flow toward the ~~anode~~.
- D. Plating takes place at the ~~anode~~.

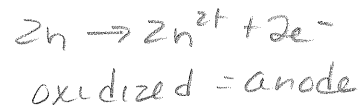


Use the following information to answer the next question.



**Numerical Response**

5. The standard electrode potential for the half-reaction  $\text{RhCl}_6^{3+}(\text{aq}) + 3 \text{e}^- \rightarrow \text{Rh}(\text{s}) + 6 \text{Cl}^-(\text{aq})$  is +/- 0.44 V.

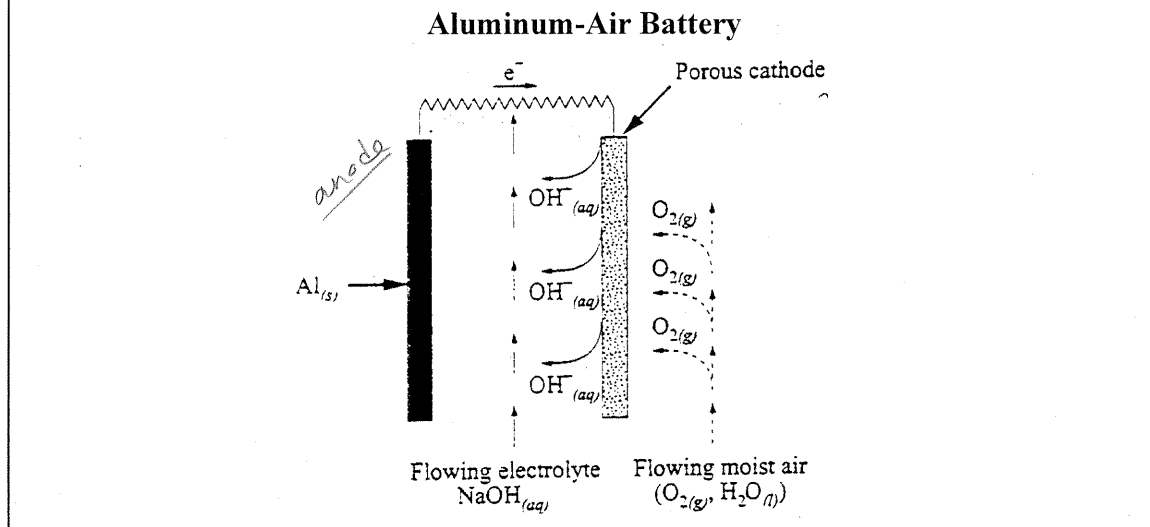


(Record your **three-digit answer** in the numerical-response section on the answer sheet)

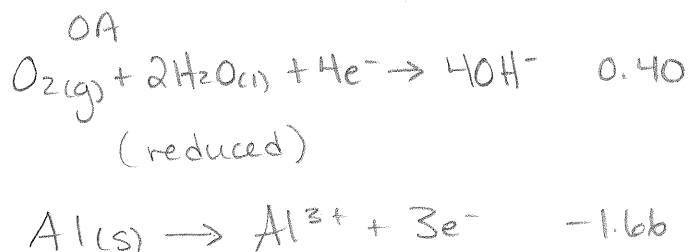
$E^\circ_{\text{cell}} = E^\circ_{\text{cath}} - E^\circ_{\text{anode}}$   
 $1.20 = x - (-0.676\text{V})$   
 $x = 0.44\text{V}$

Use the following information to answer the next four questions.

Concern about increased air pollution and the increasing use of non-renewable resources has accelerated research into alternatives to the internal combustion engine. One alternative is a battery-powered electric motor. Several “new” efficient batteries are being tested. The diagram below represents one of these batteries.



12. In this aluminum-air battery, the  $O_2(g)$  acts as the
- A. ~~reducing~~ agent and gains electrons
  - B. ~~reducing~~ agent and loses electrons
  - C. oxidizing agent and gains electrons
  - D. oxidizing agent and loses electrons



13. The reduction half-reaction for this aluminum-air battery is
- A.  $2 H_2O(l) + 2 e^- \rightarrow H_2(g) + 2 OH^-(aq)$
  - B.  $Na^+(aq) + e^- \rightarrow Na(s)$
  - C.  $O_2(g) + 4 H^+(aq) + 4 e^- \rightarrow 2 H_2O(l)$
  - D.  $O_2(g) + 2 H_2O(l) + 4 e^- \rightarrow 4 OH^-(aq)$

Use the answer selected for **Multiple Choice 15** to answer **Multiple Choice 16**.\*

14. The standard voltage produced by this aluminum-air cell is
- A. +2.36 V
  - B. +2.06 V
  - C. +0.83 V
  - D. -1.05 V

$E^\circ_{cell} = E^\circ_{cath} - E^\circ_{anode}$   
 $= 0.40 - (-1.66)$   
 $= 2.06V$

\*You can receive marks for this question even if the previous question was answered incorrectly.

Use your recorded answer for **Multiple Choice 14** to answer **Numerical Response 6**.\*

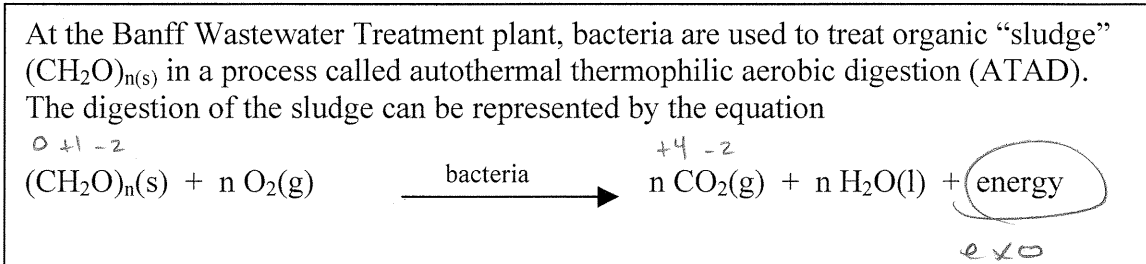
**Numerical Response**

6. When three aluminum-air cells are connected in series, the net voltage generated by the battery is +/- 6.18 V.  $2.06 \times 3 = 6.18$

(Record your **three-digit answer** in the numerical-response section on the answer sheet)

\*You can receive marks for this question even if the previous question was answered incorrectly.

Use the following information to answer the next three questions.



15. At the treatment plant, the enzymes in the bacteria act as

- A. buffers
- B. reducing agents
- C. oxidizing agents
- D. biological catalysts

16. The ATAD process is

- A. a reduction
- B. exothermic
- C. endothermic
- D. an acid-base reaction

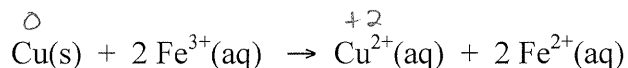
17. During the digestion process, the carbon in the sludge is

- A. reduced
  - B. oxidized
  - C. amphoteric
  - D. precipitated
- $\overset{0}{\text{C}} \xrightarrow{\text{oxidized}} \overset{+4}{\text{C}}$



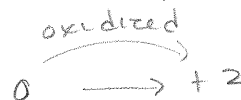
Use the following information to answer the next two questions.

Electronic hobbyists often “etch” circuit boards. In this process, unwanted copper foil is removed from a copper-clad plastic circuit board by immersing the board in a bath of iron(III) chloride solution. The equation for the net reaction is



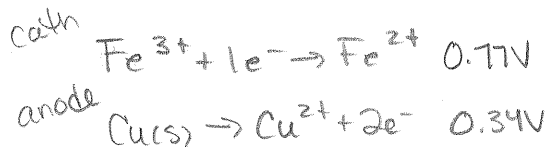
18. In the reaction above, in which the unwanted copper foil is removed,

- A. copper ions are reduced
- B. copper atoms are oxidized ✓
- C. iron(II) ions act as the oxidizing agent
- D. iron(III) ions act as the reducing agent



19. Which of the following statements and corresponding net voltages are correct for this reaction?

- A. It is a spontaneous reaction with an  $E^\circ_{\text{net}} = +0.43 \text{ V}$ .
- B. It is a spontaneous reaction with an  $E^\circ_{\text{net}} = +1.11 \text{ V}$ .
- C. A power supply is required because the  $E^\circ_{\text{net}} = -0.43 \text{ V}$ .
- D. A power supply is required because the  $E^\circ_{\text{net}} = -1.11 \text{ V}$ .



0.43V

Use the following information to answer the next question.

ICCP (Impressed Current Cathodic Protection) is a corrosion prevention technique that is used to protect buried metal structures. A low-voltage current (electron flow) is applied to the buried metal structure such that only reduction reactions can occur at its surface.

**Numerical Response**

7. The ground water surrounding the buried metal structure may contain the following ions.

- 1  $\text{Pb}^{2+}(\text{aq})$
- 2  $\text{Fe}^{2+}(\text{aq})$
- 3  $\text{Fe}^{3+}(\text{aq})$
- 4  $\text{Cd}^{2+}(\text{aq})$

SOA  
 $\text{Fe}^{3+}$   
 $\text{Pb}^{2+}$   
 $\text{Cd}^{2+}$   
 $\text{Fe}^{2+}$

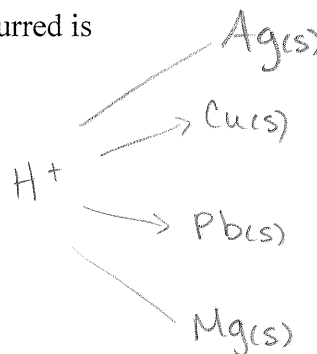
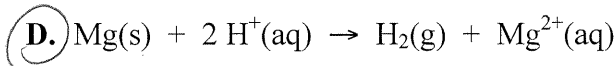
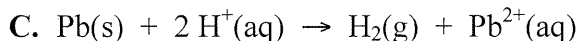
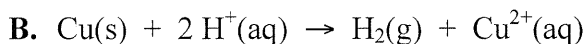
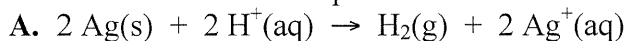
The order in which these ions are reduced on the surface of the metal structure is 3, 1, 4 and 2.

(Record your **four-digit answer** in the numerical-response section on the answer sheet)

Use the following information to answer the next three questions.

A student dipped 12.50 g strips of four different metals, Ag(s), Cu(s), Pb(s), and Mg(s), into a beaker containing 250 mL of 1.00 mol/L HCl(aq) in order to determine an activity series. One of the metals reacted immediately and vigorously with the acid.

20. The balanced net-ionic equation for the first reaction that occurred is



Use your recorded answer for **Multiple Choice 20** to answer **Numerical Response 8**.\*

**Numerical Response**

$$E^\circ_{\text{cell}} = E^\circ_{\text{cath}} - E^\circ_{\text{anode}}$$

$$0.00 - (-2.37\text{V})$$

8. The electrical potential for this reaction is +/- 2.37 V.

(Record your **three-digit answer** in the numerical-response section on the answer sheet)

\*You can receive marks for this question even if the previous question was answered incorrectly.

Use your recorded answer for **Multiple Choice 20** to answer **Numerical Response 9**.\*

**Numerical Response**

9. The mass of metal that reacted with the hydrochloric acid is 3.04 g.

(Record your **three-digit answer** in the numerical-response section on the answer sheet)

\*You can receive marks for this question even if the previous question was answered incorrectly.

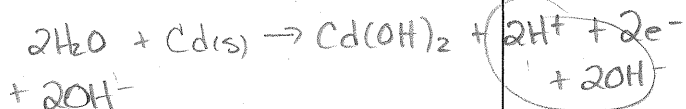
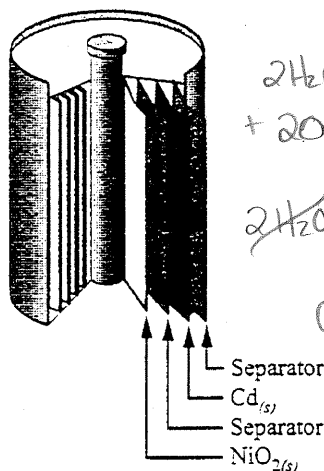


$$0.250\cancel{\text{L}} \times \frac{1.00\cancel{\text{mol}}}{\cancel{\text{L}}} \times \frac{1\cancel{\text{mol Mg}}}{2\cancel{\text{mol H}^+}} \times \frac{24.31\text{g}}{\cancel{\text{mol}}} = 3.03875\text{g}$$

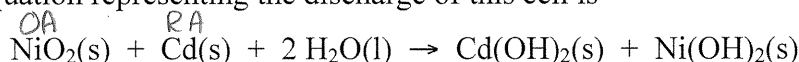
$$= 3.04\text{g}$$

Use the following information to answer the next two questions.

Voltaic cells are used as portable sources of electrical energy. One common cell is the rechargeable nickel-cadmium cell.



The equation representing the discharge of this cell is



Balancing in basic solutions

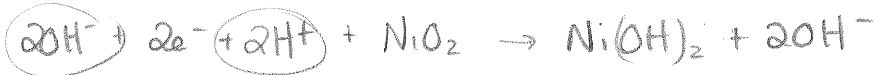
21. The oxidation half-reaction for the discharge of this cell is

- A.  $\text{Cd(s)} + 2\text{OH}^-(\text{aq}) \rightarrow \text{Cd(OH)}_2(\text{s}) + 2\text{e}^-$
- B.  $\text{NiO}_2(\text{s}) + 2\text{H}_2\text{O}(\text{l}) + 2\text{e}^- \rightarrow \text{Ni(OH)}_2(\text{s}) + 2\text{OH}^-(\text{aq})$
- C.  $\text{NiO}_2(\text{s}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow \text{Ni(OH)}_2(\text{s}) + 2\text{OH}^-(\text{aq}) + 2\text{e}^-$
- D.  $\text{Cd(s)} + 2\text{OH}^-(\text{aq}) + 2\text{e}^- \rightarrow \text{Cd(OH)}_2(\text{s})$

Not in curriculum anymore

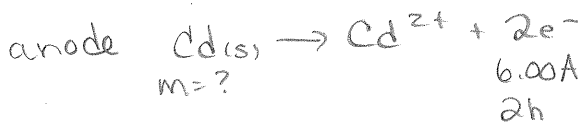
22. In this system, the strongest oxidizing agent is

- A.  $\text{NiO}_2(\text{s})$
- B.  $\text{Cd(s)}$
- C.  $\text{Cd(OH)}_2(\text{s})$
- D.  $\text{H}_2\text{O}(\text{l})$



23. If the electrochemical cell  $\text{Cd(s)} / \text{Cd}^{2+}(\text{aq}) // \text{Ag}^+(\text{s}) / \text{Ag(s)}$  produces a 6.00 A current for 2.00 h, the mass change of the anode will be a

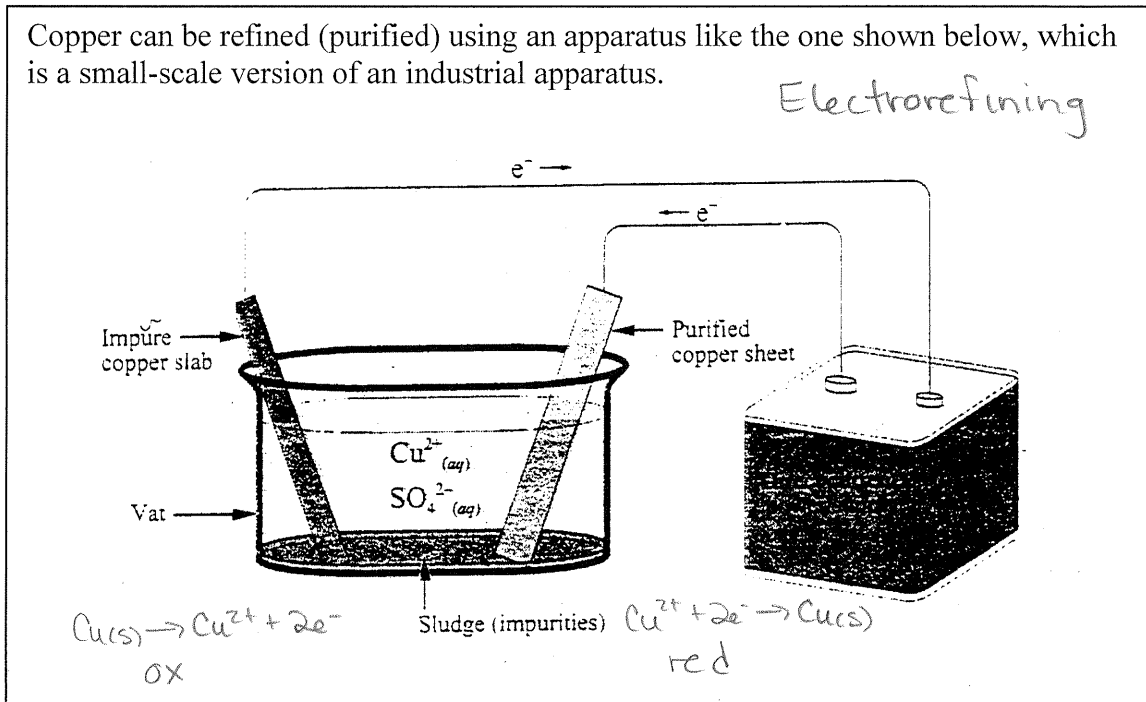
- A. 25.2 g decrease
- B. 2.25 g increase
- C. 48.3 g decrease
- D. 48.3 g increase



$$2\text{h} \times \frac{3600\text{s}}{\text{hr}} \times \frac{6.00\text{C}}{\text{s}} \times \frac{\text{mole}^-}{9.65 \times 10^4 \text{C}} \times \frac{1\text{mol Cd}}{2\text{mole}^-} \times \frac{112.41\text{g}}{\text{mol}}$$

$$= 25.2\text{g decrease}$$

Use the following information to answer the next question.



24. In this electrochemical cell, the purified copper sheet acts at the
- anode and is the site where  $\text{SO}_4^{2-}(\text{aq})$  ions are oxidized
  - cathode and is the site where  $\text{SO}_4^{2-}(\text{aq})$  ions are reduced
  - anode and is the site where  $\text{Cu}^{2+}(\text{aq})$  ions are oxidized
  - cathode and is the site where  $\text{Cu}^{2+}(\text{aq})$  ions are reduced

### Numerical Response

10. If the direct current power supply produces a steady 3.50 A current, then the time required to deposit 0.100 g of purified copper is 86.8 s.

(Record your **three-digit answer** in the numerical-response section on the answer sheet)

$$\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu(s)}$$

3.50A                  0.100g

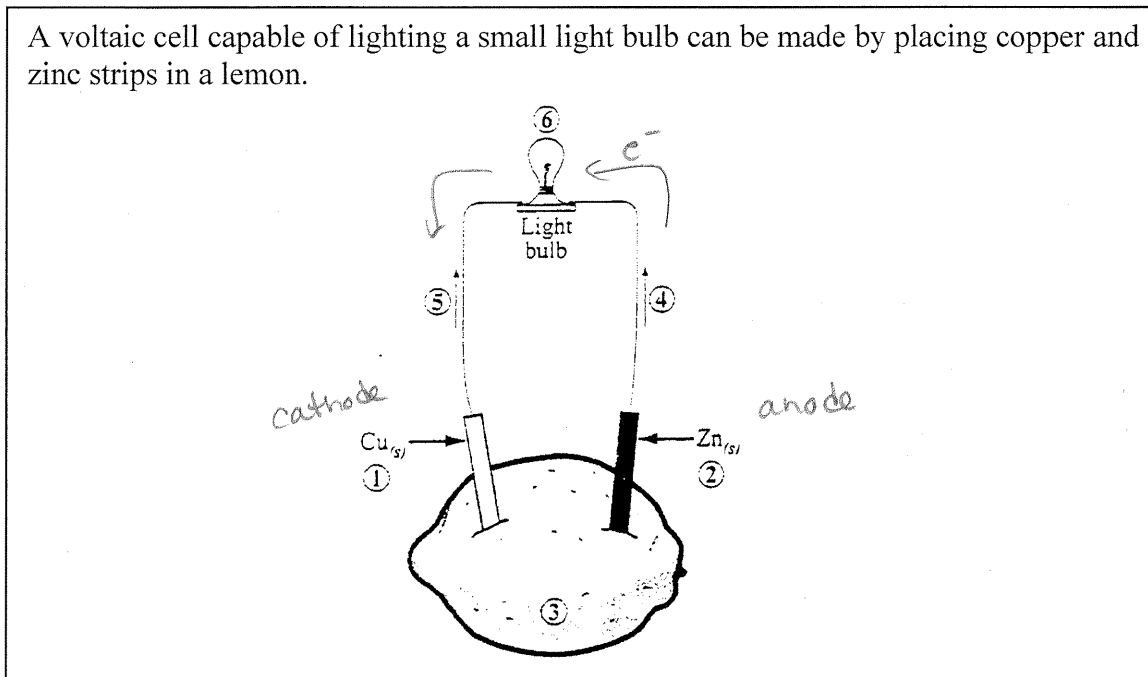
t = ?

$$0.100\text{g Cu} \times \frac{\text{mol}}{63.55\text{g}} \times \frac{2\text{mol e}^-}{1\text{mol Cu}} \times \frac{9.65 \times 10^4 \text{C}}{\text{mol e}^-} \times \frac{\text{s}}{3.50\text{C}} = 86.77$$

$$= 86.8\text{s}$$

Use the following information to answer the next question.

A voltaic cell capable of lighting a small light bulb can be made by placing copper and zinc strips in a lemon.



### Numerical Response

11. Identify the part of the voltaic cell, as numbered above, that corresponds to each of the descriptors listed below.

Anode 2 (Record in the **first** column)

Cathode 1 (Record in the **second** column)

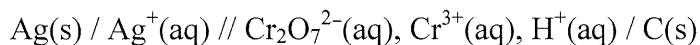
Electron flow 4 (Record in the **third** column)

Electrolyte 3 (Record in the **fourth** column)

(Record your **four-digit answer** in the numerical-response section on the answer sheet)

Use the following information to answer the next question.

A particular voltaic cell is represented by



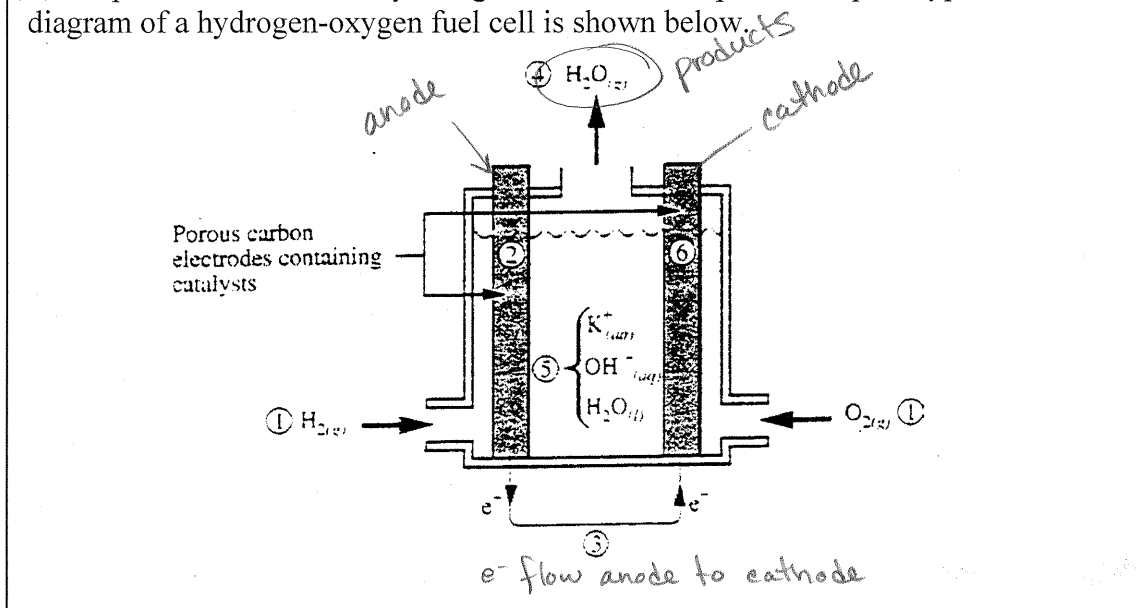
25. The net ionic equation for this voltaic cell is

- A.  $6 \text{Ag(s)} + \text{Cr}_2\text{O}_7^{2-}(\text{aq}) + 14 \text{H}^+(\text{aq}) \rightarrow 6 \text{Ag}^+(\text{aq}) + 2 \text{Cr}^{3+}(\text{aq}) + 7 \text{H}_2\text{O(l)}$   
 B.  $6 \text{Ag}^+(\text{aq}) + \text{Cr}_2\text{O}_7^{2-}(\text{aq}) + 14 \text{H}^+(\text{aq}) \rightarrow 6 \text{Ag(s)} + 2 \text{Cr}^{3+}(\text{aq}) + 7 \text{H}_2\text{O(l)}$   
 C.  $\text{Ag(s)} + \text{Cr}_2\text{O}_7^{2-}(\text{aq}) + 14 \text{H}^+(\text{aq}) \rightarrow \text{Ag}^+(\text{aq}) + 2 \text{Cr}^{3+}(\text{aq}) + 7 \text{H}_2\text{O(l)}$   
 D.  $\text{Ag}^+(\text{aq}) + \text{Cr}_2\text{O}_7^{2-}(\text{aq}) + 14 \text{H}^+(\text{aq}) \rightarrow \text{Ag(s)} + 2 \text{Cr}^{3+}(\text{aq}) + 7 \text{H}_2\text{O(l)}$



Use the following information to answer the next two questions.

Hydrogen-oxygen fuel cells have been used for years in spacecraft and more recently in small-scale power plants to generate electricity. Now, some governments and companies are working together to perfect this type of fuel cell for automobile use, and experiments are currently being conducted with operational prototypes. A diagram of a hydrogen-oxygen fuel cell is shown below.



### Numerical Response

12. In the diagram above, the anode, the cathode, the electrolyte, and a product of the reaction are labelled, respectively, 2, 6, 5, and 4.

(Record your **four-digit answer** in the numerical-response section on the answer sheet)

Use the following information to answer the next question.

The sodium metal in television picture tubes reacts with oxygen that would otherwise oxidize the tungsten and phosphorus found in the tubes. Tungsten and phosphorus are vital to the function of picture tubes.

### Numerical Response

13. The mass of sodium that will react when 0.350 mol of electrons is transferred is 8.05 g.

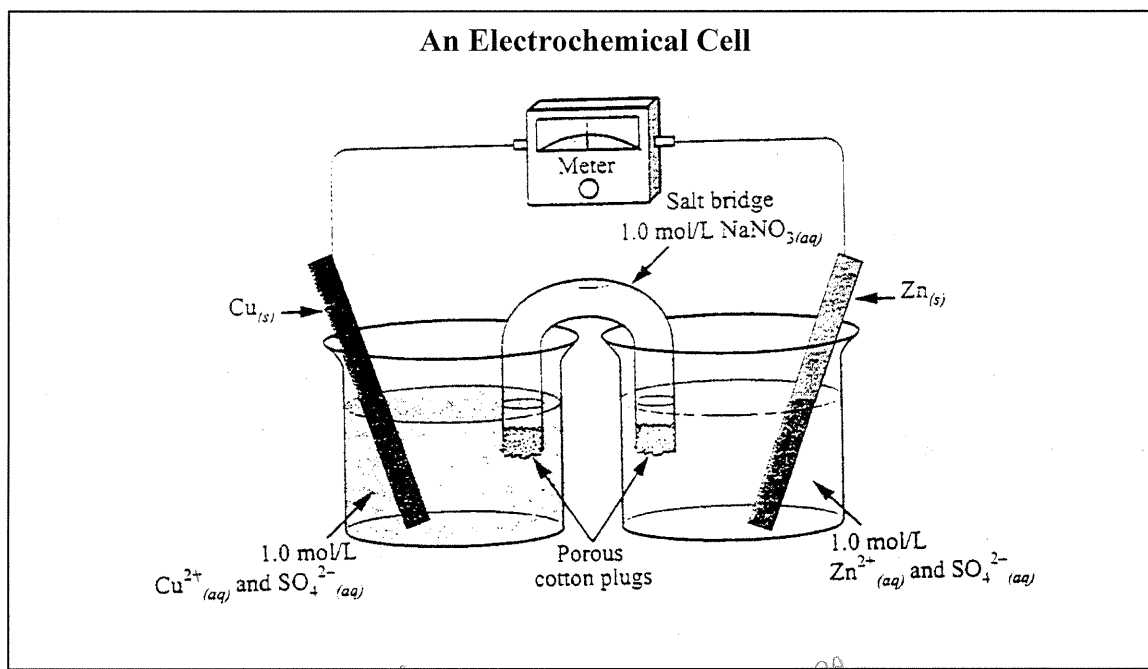
(Record your **three-digit answer** in the numerical-response section on the answer sheet)



14

$$0.350 \text{ mol} \times \frac{1 \text{ mol Na(s)}}{1 \text{ mol } e^-} \times \frac{22.99 \text{ g}}{\text{mol}} = 8.05 \text{ g}$$

Use the following information to answer the next question.

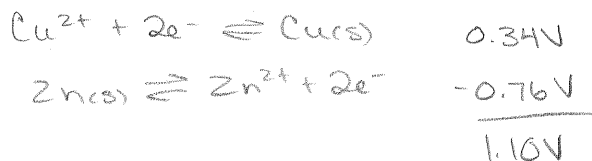


$\text{Na}^+$ ,  $\text{NO}_3^-$ ,  $\text{Cu}^{2+}$ ,  $\text{SO}_4^{2-}$ ,  $\text{Zn}^{2+}$ ,  $\text{H}_2\text{O}(\text{l})$ ,  $\text{Cu}(\text{s})$ ,  $\text{Zn}(\text{s})$   
 SOA OA RA SRA

**Numerical Response**

14. A student attempted to replicate a traditional Daniell Cell by setting up the electrochemical cell shown above. Under standard conditions, the electrical potential of the cell should be +/- 1.10 V.

(Record your **three-digit answer** in the numerical-response section on the answer sheet)

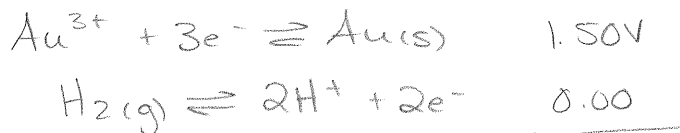


$$E^\circ_{\text{cell}} = E^\circ_{\text{cathode}} - E^\circ_{\text{anode}}$$

**Numerical Response**

15. Under standard conditions, hydrogen gas reacts with  $\text{Au}^{3+}(\text{aq})$  ions to produce  $\text{Au}(\text{s})$ . The net cell potential for the reaction is +/- 1.50 V.

(Record your **three-digit answer** in the numerical-response section on the answer sheet)



$$E^\circ_{\text{cell}} = E^\circ_{\text{cathode}} - E^\circ_{\text{anode}}$$

Use the following information to answer the next question.

In a laboratory, a student obtained the following results when testing, under standard conditions, reactions between various metals and their corresponding ions.

	Ga(s)	Fe(s)	Zn(s)	Mg(s)
<i>OAS</i> $\text{Ga}^{3+}(\text{aq})$	-	×	✓	✓
$\text{Fe}^{2+}(\text{aq})$	✓	-	✓	✓
$\text{Zn}^{2+}(\text{aq})$	×	×	-	✓
$\text{Mg}^{2+}(\text{aq})$	×	×	×	-

× denotes no reaction  
 ✓ denotes a reaction  
 - denotes not tested

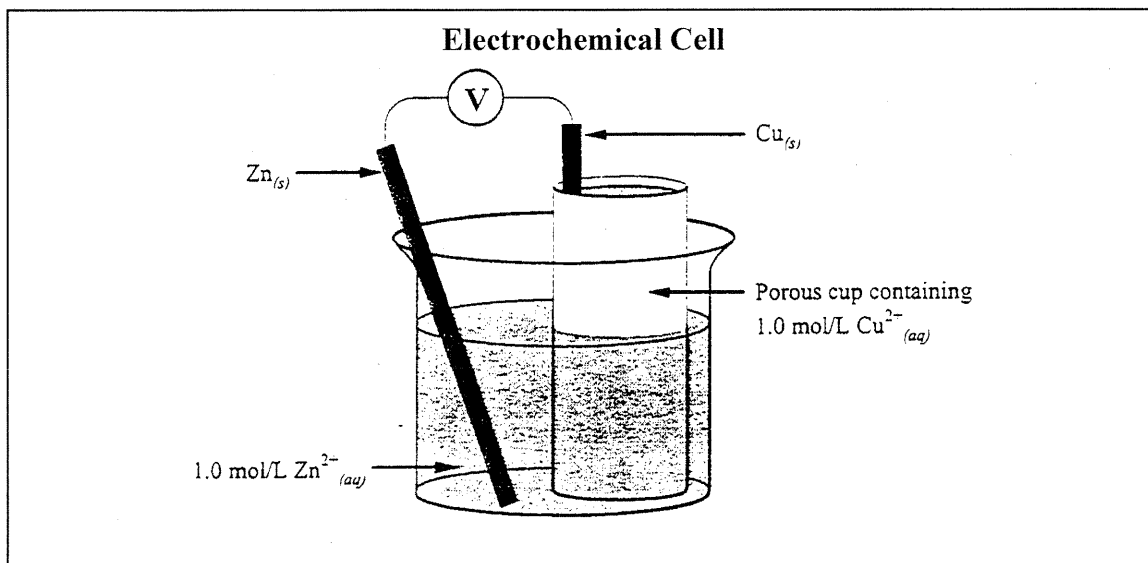
26. The reduction potential of  $\text{Ga}^{3+}(\text{aq})$  could be

- A. -0.53 V
- B. -1.41 V
- C. +1.21 V
- D. +1.92 V

<i>SOA</i>	$\text{Fe}^{2+}$	Fe	-0.45V
	$\text{Ga}^{3+}$	Ga	
	$\text{Zn}^{2+}$	Zn	-0.76V
	$\text{Mg}^{2+}$	Mg	

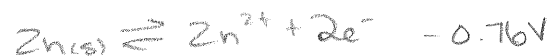
*SEA*

Use the following information to answer the next question.



27. For this cell, the potential is

- A. +1.10 V
- B. +0.42 V
- C. -0.42 V
- D. -1.10 V



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1.10V