NUNAVUT CHEMISTRY 30 · UNIT B · 10 QUESTIONS

Electrochemical Changes — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **Use the following standard reduction potentials to answer this question.**

$Mg^{2+}(aq) + 2e^- \rightarrow Mg(s)$ $E° = -2.37$ V

$Al^{3+}(aq) + 3e^- \rightarrow Al(s)$ $E° = -1.66$ V

$Mn^{2+}(aq) + 2e^- \rightarrow Mn(s)$ $E° = -1.18$ V

$Cr^{3+}(aq) + 3e^- \rightarrow Cr(s)$ $E° = -0.74$ V

The strongest reducing agent among these is

- A Al(s)
- B Mg(s)
- C Mn(s)
- D Cr(s)

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2 **Use the following standard reduction potentials to answer this question.**

$Cl_2(g) + 2e^- \rightarrow 2\ Cl^-(aq)$ $E° = +1.36$ V

$Br_2(l) + 2e^- \rightarrow 2\ Br^-(aq)$ $E° = +1.07$ V

$I_2(s) + 2e^- \rightarrow 2\ I^-(aq)$ $E° = +0.54$ V

Which of the following reactions is spontaneous under standard conditions?

A $2\ Br^-(aq) + I_2(s) \rightarrow Br_2(l) + 2\ I^-(aq)$

B $2\ Cl^-(aq) + I_2(s) \rightarrow Cl_2(g) + 2\ I^-(aq)$

C $2\ I^-(aq) + Br_2(l) \rightarrow I_2(s) + 2\ Br^-(aq)$

D $2\ Cl^-(aq) + Br_2(l) \rightarrow Cl_2(g) + 2\ Br^-(aq)$

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3

When the half reaction

$NO_3^-(aq) \rightarrow NO(g)$

is balanced in acidic solution using the lowest whole number coefficients, the number of electrons that must be added is

A 3

B 2

C 4

D 5

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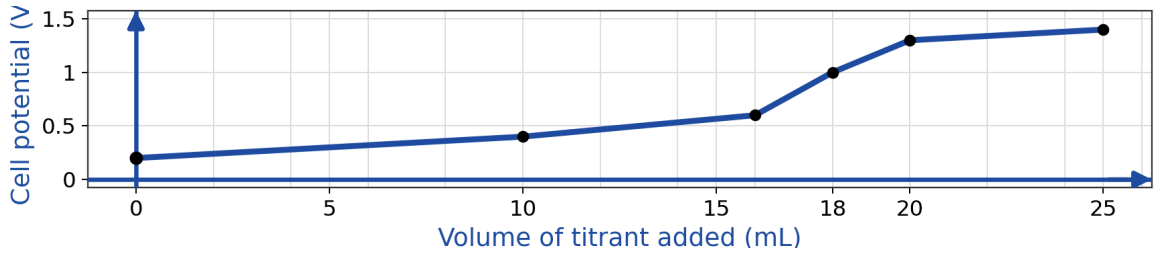
4 **A 25.00 mL sample of $Sn^{2+}(aq)$ is titrated with 0.0200 mol/L $K_2Cr_2O_7(aq)$ in acidic solution. The graph shows the cell potential during the titration.**

$Cr_2O_7^{2-}(aq) + 3\ Sn^{2+}(aq) + 14\ H^+(aq) \rightarrow 2\ Cr^{3+}(aq) + 3\ Sn^{4+}(aq) + 7\ H_2O(l)$

The concentration of the $Sn^{2+}(aq)$ solution, in mol/L, is



A 0.0432

B 0.0216

C 0.0864

D 0.0144

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5 **An aqueous solution of potassium nitrate is electrolyzed using inert electrodes. The product formed at the anode is**

A $K(s)$

B $H_2(g)$

C $N_2(g)$

D $O_2(g)$

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6

Use the following standard reduction potentials to answer this question.

$Fe^{2+}(aq) + 2e^- \rightarrow Fe(s)$ $E° = -0.45$ V

$Mg^{2+}(aq) + 2e^- \rightarrow Mg(s)$ $E° = -2.37$ V

Blocks of magnesium are attached to the steel hull of a ship to protect the hull from corrosion. This method of protection works because

A magnesium has a more positive standard reduction potential than iron

B magnesium is a stronger reducing agent than iron and is oxidized instead of the iron

C magnesium is a stronger oxidizing agent than iron

D magnesium is reduced at the surface of the iron

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7

When the half reaction

$MnO_4^-(aq) \rightarrow MnO_2(s)$

is balanced in basic solution using the lowest whole number coefficients, the coefficient of $OH^-(aq)$ is

ANSWER

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8 **Use the following equation to answer this question.**

$5\ H_2C_2O_4(aq) + 2\ MnO_4^-(aq) + 6\ H^+(aq) \rightarrow 10\ CO_2(g) + 2\ Mn^{2+}(aq) + 8\ H_2O(l)$

If 0.0250 mol of $MnO_4^-(aq)$ reacts completely, the amount of $H_2C_2O_4(aq)$ that is consumed, in moles, is

- A 0.0100
- B 0.0250
- C 0.0625
- D 0.125

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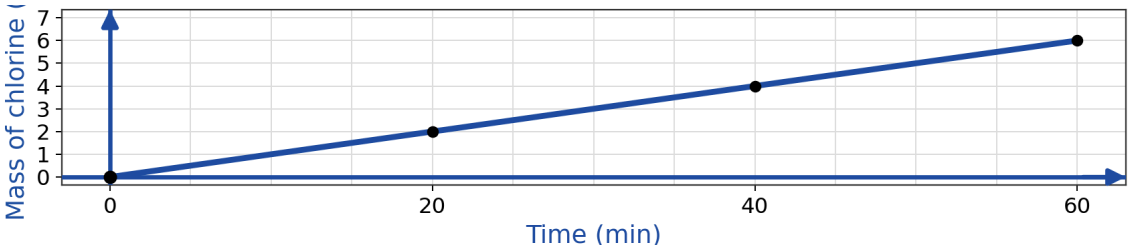
9 **The graph shows the mass of chlorine gas produced during electrolysis over time. The mass of chlorine gas produced after 60 minutes, in grams, is ____.**



ANSWER _____

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10 **Use the following standard reduction potentials to answer this question.**

$Li^+(aq) + e^- \rightarrow Li(s)$ E° = -3.04 V

$Zn^{2+}(aq) + 2e^- \rightarrow Zn(s)$ E° = -0.76 V

$Cu^{2+}(aq) + 2e^- \rightarrow Cu(s)$ E° = +0.34 V

$Ag^+(aq) + e^- \rightarrow Ag(s)$ E° = +0.80 V

$Au^{3+}(aq) + 3e^- \rightarrow Au(s)$ E° = +1.50 V

Which of the following anode/cathode combinations produces the voltaic cell with the greatest standard cell potential?

A $Cu(s)/Ag^+(aq)$

B $Zn(s)/Ag^+(aq)$

C $Zn(s)/Cu^{2+}(aq)$

D $Li(s)/Au^{3+}(aq)$

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ANSWER KEY

1. B
2. C
3. A
4. A
5. D
6. B
7. 4
8. C
9. 6
10. D

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