Unit 5 Practice Quiz – Electr

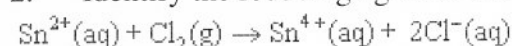| KU =	5 /5	TI =

e ✓ 1. What is the correct balanced net ionic equation for the reaction:

$Cr(NO_3)_3(aq) + Mg(s) \rightarrow Cr(s) + Mg(NO_3)_2(aq)$
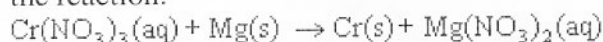
a. $Cr(NO_3)_3(aq) + Mg(s) \rightarrow Cr(s) + Mg(NO_3)_2(aq)$

b. $2Cr(NO_3)_3(aq) + 3Mg(s) \rightarrow 2Cr(s) + 3Mg(NO_3)_2(aq)$

c. $3Cr^{3+}(aq) + 2Mg(s) \rightarrow 3Cr(s) + 2Mg^{2+}(aq)$

d. $Cr^{3+}(aq) + Mg(s) \rightarrow Cr(s) + Mg^{2+}(aq)$

e. $2Cr^{3+}(aq) + 3Mg(s) \rightarrow 2Cr(s) + 3Mg^{2+}(aq)$

b ✓ 2. Identify the reducing agent in the reaction:

$Sn^{2+}(aq) + Cl_2(g) \rightarrow Sn^{4+}(aq) + 2Cl^-(aq)$

a. $Cl_2(g)$

b. $Sn^{2+}(aq)$

c. $Sn^{4+}(aq)$

d. $Cl_2(g)$

e. this is not a redox reaction

Strongest Oxidizing Agent	Weakest Reducing Agent
$Au^+(aq)$	$Au(s)$
$Pt^{2+}(aq)$	$Pt(s)$
$Ag^+(aq)$	$Ag(s)$
$Hg^{2+}(aq)$	$Hg(\ell)$
$Cu^{2+}(aq)$	$Cu(s)$
$Sn^{2+}(aq)$	$Sn(s)$
$Ni^{2+}(aq)$	$Ni(s)$
$Co^{2+}(aq)$	$Co(s)$
$Tl^+(aq)$	$Tl(s)$
$Cd^{2+}(aq)$	$Cd(s)$
$Fe^{2+}(aq)$	$Fe(s)$
$Cr^{3+}(aq)$	$Cr(s)$
$Zn^{2+}(aq)$	$Zn(s)$
$Al^{3+}(aq)$	$Al(s)$
$Mg^{2+}(aq)$	$Mg(s)$
$Ca^{2+}(aq)$	$Ca(s)$
$Ba^{2+}(aq)$	$Ba(s)$
Weakest Oxidizing Agent	Strongest Reducing Agent

c ✓ 3. In the reaction: $Al(s) + O_2(g) \rightarrow Al_2O_3(s)$, how many electrons does an atom of aluminum lose or gain?

a. aluminum loses 1 electron

b. aluminum gains 1 electron

c. aluminum loses 3 electrons

d. aluminum gains 3 electrons

e. there is no loss or gain of electrons

d ✓ 4. Which of these reactions will proceed spontaneously, based on relative strength of reducing agents?

a. $Cu(s) + Fe^{2+}(aq) \rightarrow Cu^{2+}(aq) + Fe(s)$

b. $Cr(s) + Zn^{2+}(aq) \rightarrow Cr^{3+}(aq) + Zn(s)$

c. $Al(s) + Ca^{2+}(aq) \rightarrow Al^{3+}(aq) + Ca(s)$

d. $Ba(s) + Ca^{2+}(aq) \rightarrow Ba^{2+}(aq) + Ca(s)$

e. $Mg(s) + Ca^{2+}(aq) \rightarrow Mg^{2+}(aq) + Ca(s)$

d ✓ 5. Which of the following statements is correct for an electrochemical cell? galvanic

a. the anode and cathode both increase in mass

b. the anode and cathode both decrease in mass

c. the anode increase in mass while the cathode decreases in mass

d. the anode decreases in mass while the cathode increases in mass

e. there is never a change in mass for either electrode in an electrochemical cell
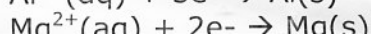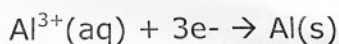
Problems

1. Balance the following reaction in a BASIC solution. (4 marks T)

$$NO_2^{-1}(aq) + Al(s) \rightarrow NH_3(g) + AlO_2^{-1}(aq)$$

$OH^- + H_2O + NO_2^- + 2Al \rightarrow NH_3 + 2AlO_2^-$
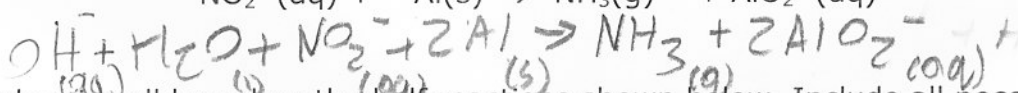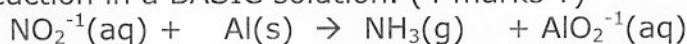
2. Sketch a galvanic cell based on the half reactions shown below. Include all necessary metals and solutions in your diagram, along with the requirements outlined below.

$Al^{3+}(aq) + 3e^- \rightarrow Al(s)$

$Mg^{2+}(aq) + 2e^- \rightarrow Mg(s)$

flow of I

←

20)

flow of e^-

→

↓ wire

Anode

↓

cathode

↙

Mg

NO_3^- KNO_3 K^+

Al

salt bridge

Mg^{2+}

AlF_3

↑ electrolyte
solution
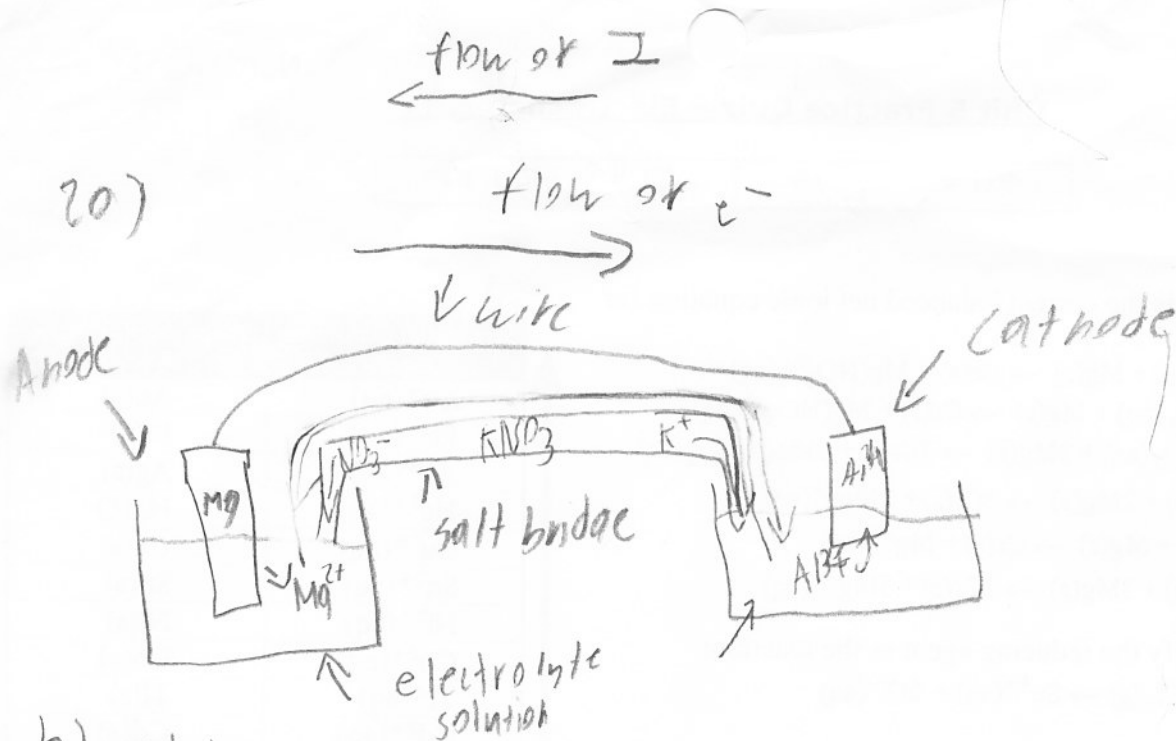
b) oxidation is occuring at anode, reduction at cathode

c) electrons flow from Mg to Al, from Anode to cathode

d) the ions flow from the magnesium side through the salt
bridge to the Aluminium side

e) $Mg_{(s)} + Al^{3+} \rightarrow Mg^{2+} + Al$

$Mg_{(s)} + Al^{3+} + 3e^- \rightarrow Mg^{2+} + Al + 3e^-$

$3Mg_{(s)} + 2Al^{3+} + 6e^- \rightarrow 3Mg^{2+} + 2Al$

f) $Mg_{(s)} | Al^{3+} || Mg^{2+} | Al$ $Mg | Mg^{2+} || Al^{3+} , Al$