University of Kentucky   **Department of Chemistry**

Read these directions carefully before starting the examination.

It is **extremely** important that you fill in the answer sheet **exactly** as indicated, otherwise your test may not be processed; ALL entries are to be made on SIDE 1 of the answer sheet. Use a #2 pencil (or softer); <u>fill in the circles completely and firmly. Erasures must be complete</u>. Use only the following categories:

NAME:	Print your name starting at the first space, LAST NAME first, then a space, followed by your FIRST NAME, then another space, followed by your MIDDLE INITIAL. Fill in the **correct** circles below your printed name corresponding to the letters of your name; for the spaces, fill in the top blank circle.
STUDENT NUMBER:	This is **very important.** Put in your **8 digit student ID number** (do not **use the 9 at the beginning of your number**) beginning in column A and continuing through column H, column I will be blank, (do NOT use column J at this time) under IDENTIFICATION NUMBER; be sure to fill in the correct circles (a common error to be avoided is mistaking "0" for "1").
TEST FORM:	Fill in the "4" blank in the J column under IDENTIFICATION NUMBER (to indicate Hour Examination IV).

SPECIAL CODES:	Use for course and section number; in positions K-P write in one of the following:
	
	          Dr. K. Woodrum 107-001, 107-002
	          Dr. F. Bramwell 107-003, 107-004
	          Ms. S. Newman 107-401

SIGNATURE:	You **must** sign the examination answer sheet (bubble sheet) on the line directly above your printed name. Use your legal signature.

<u>Answering Questions</u>:

Starting with answer "1" on SIDE 1, fill in the circle indicating the <u>one best answer</u> for each of the 25 questions in this examination. Your score is the sum of the appropriate credit for each response. Soon after the examination is finished, an examination key will be posted on Blackboard.

<u>Grading and Reporting</u>:

The examination scores will be posted in Blackboard as soon as possible after the examination. If an error has been made in scoring your answers, tell your instructor within 48 hours of the posting of your score.

Be sure that your test has 60 questions, a periodic table, and two sheets of scratch paper. You may **not** use your own scratch paper during this examination. Cell phones and pagers are to be turned off and out of sight during the exams. **All** exam paper, scratch paper, and scantrons must be handed in at the end of the exam. You may **not** take any exam materials away from the exam room.

1. Which of these statements is **true for gases but false for liquids**?

   A. Are in constant motion
   C. Have a high density
   B. Volume is determined by the amount of substance
   D. Are compressible

2. Which of the following groups of compounds has the normal boiling points arranged in decreasing temperature order?

   A. H_2S, H_2Se, H_2Te, H_2O
   C. SnH_4, SiH_4, GeH_4, CH_4
   B. HF, HCl, HBr, HI
   D. NH_3, PH_3, AsH_3, SbH_3

3. Which of these statements is false concerning water?

   A. Water has a low surface tension.
   B. The intermolecular forces between molecules are strong hydrogen-bonding attractions.
   C. The solid phase is less dense than the liquid phase.
   D. Water is more viscous than hexane, C_6H_{14}.

4. When X rays of wavelength 326 nm are diffracted by a metallic crystal, the angle of first order diffraction (n=1) is measured to be 42.6^o. What is the distance (in pm) between the layers of atoms responsible for the diffraction?

   A. 2.41×10^5 pm
   C. 2.68×10^2 pm
   B. 1.10×10^2 pm
   D. 4.82×10^5 pm

5. Which statement is **true** concerning the face centered unit cell?

   A. The cell contains six atoms.
   B. The cell contains lattice points on the corners, face and in the body of the cell.
   C. The face centered atoms are shared between four cells.
   D. The coordination number is 2.

6. The crystal structure of the unit cell for ZnS has S^{2-} ions occupying the lattice points of a face-centered cube. Zn^{2+} ions are located along each interior diagonal of the unit cell. How many Zn^{2+} ions and how many S^{2-} ions (combined) occupy the unit cell?

    A. 4   C.   12

    B. 6   D.   8

7. At 25 $^{\circ}$C, the vapor pressure of water is 23.8 mmHg. At 70 $^{\circ}$C, the vapor pressure of water is 233.7 mmHg. Calculate ΔH_{vap} for water.

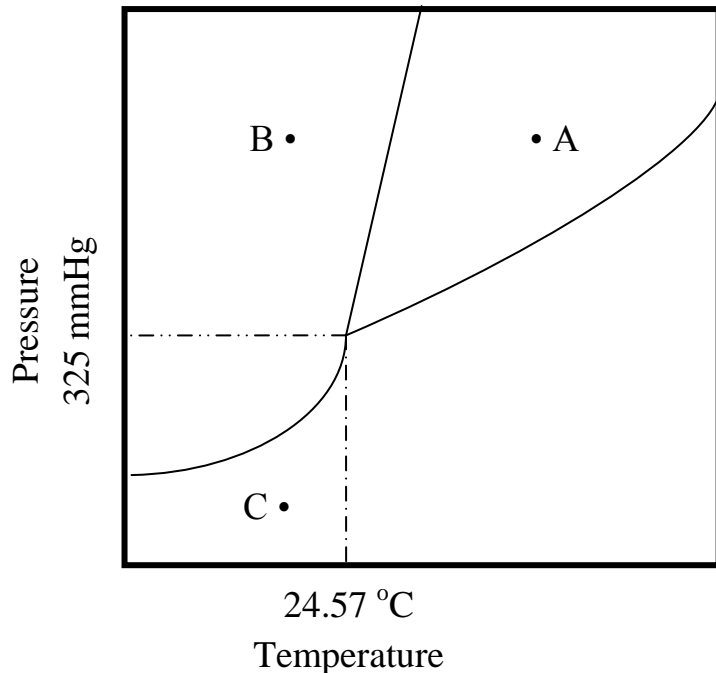   A. 922 kJ/mol   C.   29.6 kJ/mol

    B. 69.2 kJ/mol   D.   43.1 kJ/mol

8. What phase changes occur as the temperature decreases from point A to point B and then the pressure decreases from point B to point C?

    A. Freezing, Boiling   C.   Freezing, Sublimation

    B. Condensation, Melting   D.   Melting, Deposition

9. At 20°C, a liquid solution contains 138 g sodium acetate trihydrate in 100 g water. The composition of a saturated solution of sodium acetate trihydrate at 20°C is 46.5 g sodium acetate trihydrate in 100 g water. The liquid solution is said to be:

    A. Supersaturated   C. Hyposaturated

    B. Unsaturated   D. Saturated

10. Calculate the percent by mass of a solution prepared by dissolving 25.0 grams of potassium nitrate (KNO_3) in 150.0 grams of water.

    A. 16.7 %   C. 6.00 %

    B. 14.3 %   D. 20.0 %

11. Which of these are the optimum conditions for carbon dioxide gas to dissolve in water?

    A. High temperature and high pressure of CO_2.

    B. Low temperature and high pressure of CO_2.

    C. Low temperature and low pressure of CO_2.

    D. High temperature and low pressure of CO_2.

12. What is the concentration of CO_2 in an opened soft drink with a partial pressure of CO_2 of 2.6×10^{-3} atm over the liquid at 25°C? The Henry's Law constant for CO_2 in water at 25°C is 3.1×10^{-2} mol/L·atm.

    A. 1.0×10^{-4} M C. 8.1×10^{-5} M

    B. 9.9×10^{-6} M D. 6.8×10^{-5} M

13. The freezing point of pure benzene is 5.50 °C, and its K_f is 5.12 °C/m. A solution in liquid benzene, that was prepared by dissolving 2.50 g unknown non ionic sample in 25.0 g benzene, freezes at 4.30°C. What is the molar mass of the unknown compound?

    A. 10.7 g/mol   C. 110 g/mol

    B. 427 g/mol   D. 169 g/mol

14. Which of these solutes would have the largest effect on the boiling point of a solvent, assuming the same number of moles of each solute was added to the quantity of solvent?

A. $FeCl_2$ C. $C_6H_5NH_3$

B. $NaNO_3$ D. CO_2

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15. Which of the following is true?

A. Colloids are solutions that have very, very high concentrations.

B. Colloids have larger particles suspended in the solvent than solutions.

C. A colloid will not scatter a beam of light; whereas, a solution will.
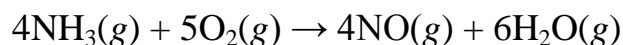
D. Colloids are solutions that also contain a precipitate.

Questions 16 – 30: Material from Exam2

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16. Consider the reaction

$$4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(g)$$

Suppose that at a particular moment during the reaction, molecular oxygen is reacting at a rate of 0.450 M/s. At what rate is water forming?

A. 0.540 M/s   C. 0.375 M/s

B. 0.450 M/s   D. 0.0900 M/s

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17. Which of the following statements is **true**?

A. The overall reaction order is the product of the powers to which all the reactant concentrations appearing in the rate law are raised.

B. Rate laws are never determined experimentally but result only from theoretical calculations involving the activation energy and the order constant.

C. The rate law expresses the relationship of the rate of a reaction to the rate constant.

D. The rate law expresses the relationship of the rate of a reaction to the concentrations of the *products* raised to some powers.

18. Which of the following is **false** concerning the relation between reactant concentration and reaction half-life?

    A. For second-order reactions the half-life is shorter at an early stage of the reaction than toward the end.

    B. For zero-order reactions, the half-life depends on the initial reactant concentration.

    C. For first-order reactions, the rate constant, k, is independent of the reaction half-life.

    D. For first-order reactions the half-life is independent of the initial reactant concentration.
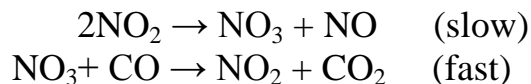
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19. In a given reaction, the rate constant triples when the temperature is increased from 185K to 235K. What is the activation energy of this reaction?

    A. 10.0 kJ/mol   C. 1.21 kJ/mol

    B. 8.34 kJ/mol   D. 7.94 kJ/mol

20. The mechanism for the reaction of carbon monoxide and nitrogen dioxide is as follows:

$$2NO_2 \rightarrow NO_3 + NO \quad \text{(slow)}$$
$$NO_3 + CO \rightarrow NO_2 + CO_2 \quad \text{(fast)}$$

Which statement is **false**?

    A. The overall reaction is $CO + NO_2 \rightarrow CO_2 + NO$

    B. For the overall reaction, $Rate = k[CO][NO_2]$

    C. NO_3 is an intermediate.

    D. The reaction is second order in NO_2 and second order overall.

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21. Consider the following reaction at some high temperature, T.
$$Br_2(g) \rightleftharpoons 2Br(g)$$
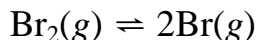
A 5.0 L vessel has 5.0 moles of Br_2 placed into it. The reaction reaches equilibrium where it is found that the mixture contains 4.0 moles of Br_2. What is the value of K_c at this temperature, T?

    A. 0.50   C. 0.25

    B. 0.20   D. 0.80

22. K_1 is the equilibrium constant for the reaction $H_3PO_4 \rightleftharpoons H_2PO_4^{2-} + H^+$;

K_2 is the equilibrium constant for the reaction $H_2PO_4^{2-} \rightleftharpoons HPO_4^- + H^+$;

K_3 is the equilibrium constant for the reaction $HPO_4^- \rightleftharpoons PO_4^{3-} + H^+$.

What is the value of the equilibrium constant in terms of K_1, K_2, and K_3 for the reaction $3PO_4^{3-} + 9H^+ \rightleftharpoons 3H_3PO_4$?
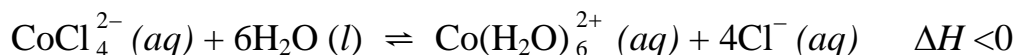
A. $K = (K_1 K_2)/K_3$

B. $K = 3(K_1 + K_2 + K_3)$

C. $K = (K_1 K_2 K_3)^{-3}$

D. $K = K_1 /(K_2 K_3)$

23. For the reaction $A(g) + 2B(g) \rightleftharpoons 3C(g)$. $K_c = 5 \times 10^5$ at 298 K.

At this temperature, an equal number of moles of each substance is placed into a 1.0 L container. Which statement is **true**?

A. To reach equilibrium, the reaction will shift to produce more products.

B. To reach equilibrium, the reaction will shift to produce more reactants.

C. The system is at equilibrium.

D. More information is required to determine which direction the equilibrium will shift.

24. What is the effect of decreasing the temperature on the following equilibrium systems :

$CuSO_4 (aq) + 4NaBr (aq) \rightleftharpoons Na_2CuBr_4 (aq) + Na_2SO_4 (aq)$ $\Delta H > 0$

$CoCl_4^{2-} (aq) + 6H_2O (l) \rightleftharpoons Co(H_2O)_6^{2+} (aq) + 4Cl^- (aq)$ $\Delta H < 0$

$CaO (s) + CO_2 (g) \rightleftharpoons CaCO_3 (s)$ $\Delta H < 0$

A. shift right, shift left, more CO_2

B. shift left, shift right, less CO_2

C. shift left, shift right, more CO_2

D. shift right, shift left, less CO_2

25. The equilibrium constant K_c for the reaction $H_2(g) + Br_2(g) \rightleftharpoons 2HBr(g)$ is 2.18×10^6 at $730°C$. At equilibrium the system had $[HBr] = 0.100M$ and $[H_2] = [Br_2] = 6.77 \times 10^{-5}\ M$. Then H_2 is added to double its concentration. Which of these statements accurately describes the system's response to the change?

A. There is no change to the system.

B. The reverse reaction rate is increased.

C. There is a decrease in the concentration of HBr.

D. There is a decrease in the concentration of Br_2.

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26. Which statement is true concerning a $0.010\ M$ weak acid solution?

A. $pH = 2.00$

B. $[H^+] = [OH^-]$

C. $[OH^-] < 1.0 \times 10^{-12}$

D. $pH > 2.00$

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27. What is the pH of $4.3 \times 10^{-4}\ M\ Ca(OH)_2$?

A. 10.63

B. 3.07

C. 10.93

D. 3.37

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28. Which of the following lists the solutions from lowest to highest pH? Each solution is $0.10\ M$. (Note: K_a of HCOOH is 1.7×10^{-4} and the K_a of HCN is 4.9×10^{-10})

A. pH (HCN) < pH(HCOOH) < pH (H_2SO_4)

B. pH (H_2SO_4) < pH(HCOOH) < pH (HCN)

C. pH (H_2SO_4) < pH (HCN) < pH (HCOOH)

D. pH (HCOOH) < pH (HCN) < pH (H_2SO_4)

29. What is the pH of a 0.23 M benzoic acid solution? Consider benzoic acid to be a monoprotic acid. $K_a = 6.5 \times 10^{-5}$

A.	3.65	C.	2.41
B.	3.35	D.	2.62

30. Which of these statements best describe the relationship between ionization constants?

   A. The K_b is the reciprocal of the conjugate acid's K_a.

   B. K_b is the equilibrium constant of the dissociation of an acid to its conjugate base.

   C. The larger the K_b, the stronger the acid.

   D. The K_b of a conjugate base is the K_w divided by the K_a of the acid.

Questions 31 – 45: Material from Exam 3

31. Which of the following 0. 10 M polyprotic acids will have a pH less than 1 in aqueous solution?

A.	H_2CO_3	C.	H_2SO_4
B.	H_2S	D.	H_3PO_4

32. What is the pH of a 0.30 M potassium acetate (CH_3COOK). K_a (CH_3COOH) $= 1.8 \times 10^{-5}$.

A.	4.75	C.	9.11
B.	5.91	D.	10.25

33. Which of the following is the most basic oxide?

A.	K_2O	C.	Ga_2O_3
B.	MgO	D.	Cl_2O_7

34. What is the Lewis acid and Lewis base in the following reaction?

$$Ni \ (s) \ + 4 \ CO \ (g) \rightarrow Ni(CO)_4 \ (g)$$

A. Acid: CO, Base: $Ni(CO)_4$ C. Acid: Ni, Base: CO

B. Acid: CO, Base: Ni   D. Acid: Ni, Base: $Ni(CO)_4$

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35. What is the ammonium ion concentration in a solution that is 0.0500 M in ammonia, and $8.80 \times 10^{-6} \ M$ in OH^- ? $K_b(NH_3) = 1.76 \times 10^{-5}$.

A. $2.0 \times 10^{-3} \ M$ C. 1.50 M

B. 0.0500 M D. 0.102 M

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36. How many moles of NH_4Cl must be added to 100.0 mL of 0.25 M NH_3 to prepare a buffer with pH = 9.50? $K_b(NH_3) = 1.76 \times 10^{-5}$.

A. 0.19 mol   C. 0.025 mol

B. 0.014 mol   D. 150 mol

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37. Which one of these statements is **true** when a weak base is titrated with a strong acid?

A. The pH of the solution is always determined by the amount of strong acid, since the base is weak.

B. The pH of the equivalence point is greater than 7.

C. During the titration, the H^+ concentration in solution is always the same as the concentration of the added strong acid.

D. The pH of the mixture decreases throughout the titration.

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38. For a certain indicator, the acid form is red and the base form is yellow. The K_a for this indicator is 3.2×10^{-5}. At what pH will the solution appear orange?

A. 1.5   C. 7.0

B. 4.5   D. 10.0

39. The K_{sp} of calcium fluoride is 3.0×10^{-11}. What is the molar solubility of calcium fluoride?

A. 2.5×10^{-5} M

C. 5.5×10^{-7} M

B. 9.0×10^{-22} M

D. 2.0×10^{-4} M

40. Which statement is true concerning the addition of NaI to a 0.0010 M Pb(NO$_3$)$_2$ solution. K_{sp} (PbI$_2$) $= 1.4 \times 10^{-8}$.

A. Since NaI and Pb(NO$_3$)$_2$ are both soluble salts, no precipitate will form

B. PbI$_2$ will precipitate when $[I^-] > \left(\dfrac{1.4 \times 10^{-8}}{0.0010} \right)^2$

C. PbI$_2$ will precipitate when $[I^-] > \left(\dfrac{1.4 \times 10^{-8}}{0.0010} \right)$

D. PbI$_2$ will precipitate when $[I^-] > \sqrt{\left(\dfrac{1.4 \times 10^{-8}}{0.0010} \right)}$

41. What is the molar solubility of AgCl in $2.5 \times 10^{-4} M$ AgNO$_3$ if the K$_{sp}$ of AgCl is 1.6×10^{-10}?
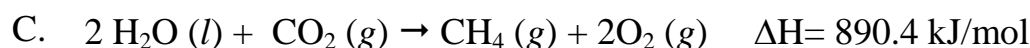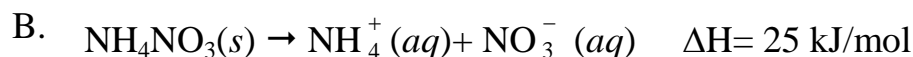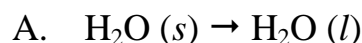
A. $2.5 \times 10^{-4} M$

C. $4.0 \times 10^{-4} M$

B. $1.6 \times 10^{-3} M$

D. $6.4 \times 10^{-7} M$

42. Which one of the following processes that occurs at 298 K is an example of a non spontaneous process?

A. H$_2$O $(s) \rightarrow$ H$_2$O (l)

B. NH$_4$NO$_3(s) \rightarrow$ NH$_4^+$ (aq) + NO$_3^-$ (aq) ΔH= 25 kJ/mol

C. 2 H$_2$O (l) + CO$_2$ $(g) \rightarrow$ CH$_4$ (g) + 2O$_2$ (g) ΔH= 890.4 kJ/mol

D. H$^+$ (aq) + OH$^-$ $(aq) \rightarrow$ H$_2$O (l) ΔH= -56.2 kJ/mol

43. Are the entropy changes in the following systems strongly positive (+), strongly negative (−), or small in magnitude (0)?

    1. $H_2 (g) + Cl_2 (g) \rightarrow 2H_2O (g)$
    2. $CaCO_3 (s) \rightarrow CaO (s) + CO_2 (g)$
    3. $Ni (s) + 4CO (g) \rightarrow Ni(CO)_4 (g)$

A. +, +, −   C.   −, +, 0

B. 0, +, −   D.   +, 0, −

44. Which statement is true?

A. If $\Delta S_{rxn} + \Delta S_{surr} > 0$, a reaction will be spontaneous.

B. If $\Delta S_{univ} = 0$, a reaction is spontaneous.

C. If $\Delta S_{rxn} > 0$, the reaction is spontaneous.

D. If $\Delta S_{rsn} = 0$, a reaction is at equilibrium.

45. Given the standard entropy values in the table below, determine the standard entropy change of the oxidation-reduction reaction which produces **15.0 grams** of metallic copper according to the reaction:

$$H_2(g) + CuO(s) \rightarrow Cu(s) + H_2O(g)$$
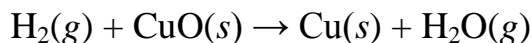
Substance	S^o (J/K·mol)
$H_2(g)$	131.0
$H_2O(g)$	188.7
$Cu(s)$	33.3
$CuO(s)$	43.5

A. 7.47 J/K   C.   45.6 J/K

B. −47.5 J/K   D.   11.2 J/K

46. Calculate ΔG^o_{rxn} for the following reaction, given the table below.

$$2Al(s) + 3ZnO(s) \rightarrow Al_2O_3(s) + 3Zn(s)$$
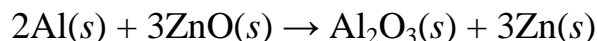
Substance	ΔG^o_f, kJ/mol
ZnO(s)	−318.2
Al$_2$O$_3$(s)	−1576.4

A. −2531.0 kJ/mol C. −621.8 kJ/mol
B. 612.4 kJ/mol D. 2258.2 kJ/mol

47. The following reaction, at 298 K, yields $K=7.00 \times 10^5$ under standard conditions.

$$N_2(g) + 3\ H_2\ (g) \rightleftharpoons 2\ NH_3\ (g)$$
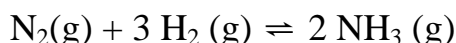
What is the value of ΔG in kJ/mol at 298 K for a reaction mixture that consists of 1.00 atm N_2, 3.00 atm H_2, and 0.500 atm NH_3 ?

A. −44.9 kJ/mol C. −33.3 kJ/mol
B. −11.6 kJ/mol D. −21.7 kJ/mol

48. Balance this basic redox reaction using the ion-electron method. When balanced, what is the coefficient for $Bi(OH)_3$ and H_2O respectively?

$$Bi(OH)_3 + SnO_2^{2-} \rightarrow SnO_3^{2-} + Bi$$
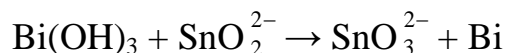
A. 2 Bi(OH)$_3$, 3 H$_2$O
B. 1 Bi(OH)$_3$, 3 H$_2$O
C. 1 Bi(OH)$_3$, 0 H$_2$O
D. 2 Bi(OH)$_3$, 6 H$_2$O

49. Given the following excerpt from the standard reduction potential table below, which of the following substances will reduce Ag^+ to Ag (s)?

Half reaction	$E^o(V)$
$Au^{3+}(aq) + 3e^- \rightarrow Au(s)$	+1.50
$Br_2(l) + 2e^- \rightarrow 2Br^-(aq)$	+1.07
$Ag^+(aq) + e^- \rightarrow Ag(s)$	+0.80
$I_2(s) + 2e^- \rightarrow 2I^-(aq)$	+0.53
$Na^+(aq) + e^- \rightarrow Na(s)$	−0.25

A. $Au^{3+}(aq)$ C. $I_2(s)$

B. $Br^-(aq)$ D. $Na(s)$

50. What is standard reduction potential for the cathode half cell reaction in the "Dry Cell" given the overall reaction

$$Zn\ (s) + 2NH_4^+\ (aq) + 2MnO_2\ (s) \rightarrow Zn^{2+}\ (aq) + 2NH_3\ (aq) + H_2O\ (l) + Mn_2O_3\ (s)$$

where $E^o_{cell} = 1.50$ and zinc serves as the anode?

The reduction potential for $Zn^{2+} + 2e^- \rightarrow Zn = -0.76$ V

A. 0.74 V   C. −0.76 V

B. 2.24 V   D. 2.26 V

51. Calculate the ΔG^o for the following reaction at 25°C

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

Half reaction	$E^o(V)$
$Al^{3+}(aq) + 3e^- \rightarrow Al(s)$	-1.66
$Mg^{2+}(aq) + 2e^- \rightarrow Mg(s)$	-2.37

A. −68.5 kJ/mol   C. 205.5 kJ/mol

B. −411 kJ/mol   D. 2330 kJ/mol

52. Refer to the table in question number 49. Determine the cell potential (E) for the following cell at 25 °C:

$$Ag(s)|Ag^+(aq, 0.010\ M)||Au^{3+}(aq, 0.25\ M)|Au(s)$$
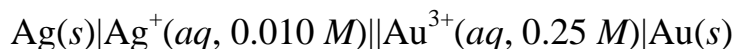
A. 0.81 V

B. 0.73 V

C. 0.70 V

D. 0.55 V

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53. The advantages of lithium-ion batteries are:

1) light weight
2) most negative standard reduction potential
3) yield water as by-product of the electrochemical reaction
4) large number of charge-discharge cycles

A. 1 and 2 only

B. 1 and 3 only

C. 1, 2 and 4 only

D. 1, 2, and 3 only

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54. Which statement is **false** concerning corrosion and prevention of corrosion?

A. Corrosion is the deterioration of a metal by reducing it when exposed to the elements in nature.

B. Rusting is the corrosion of iron.

C. Cathode protection protects a metal by making it the cathode in a galvanic cell.

D. Galvanization protects steel by coating it with zinc.

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55. How many grams of Ca(s) will be produced if 0.500A are passed through the cell from 2.00h?
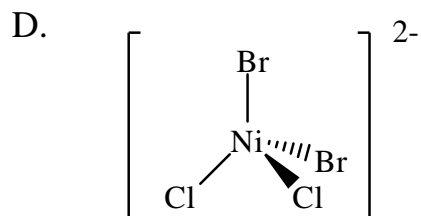
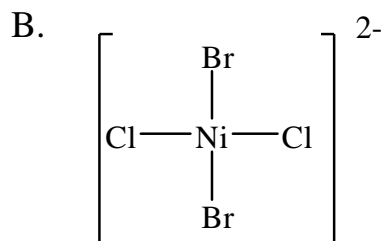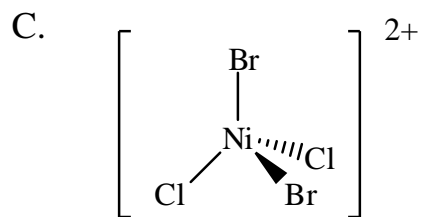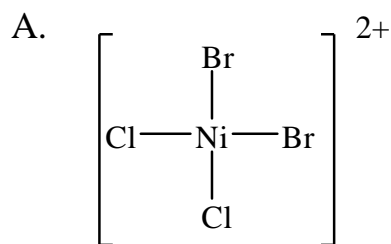$$Ca^{2+}(aq) + 2Cl^-(aq) \rightarrow Ca(s) + Cl_2(g)$$
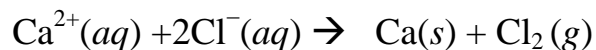
A. 0.0208 g

B. 0.748 g

C. 1.50 g

D. 4.01 g

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56. Which of the following properties contributes to the higher densities, melting points, and boiling points of transition metals when compared to Group 1A metals?

A. Transition metals have a close-pack structure and small atomic radii.

B. Transition metals have a protective layer of oxide.

C. Transition metals are more electronegative than Group 1A metals.

D. Transition metals are inert toward acids.

57. An isomer of dibromodicholornickelate(II) has a zero dipole moment. Which of the following shows the correct geometry and overall charge of the ion?

A.

$$\left[\begin{array}{c} \text{Br} \\ | \\ \text{Cl}-\text{Ni}-\text{Br} \\ | \\ \text{Cl} \end{array} \right]^{2+}$$

C.

$$\left[\begin{array}{c} \text{Br} \\ | \\ \text{Ni}^{\cdots\prime\prime\prime}\text{Cl} \\ \text{Cl} \quad \text{Br} \end{array} \right]^{2+}$$

B.

$$\left[\begin{array}{c} \text{Br} \\ | \\ \text{Cl}-\text{Ni}-\text{Cl} \\ | \\ \text{Br} \end{array} \right]^{2-}$$

D.

$$\left[\begin{array}{c} \text{Br} \\ | \\ \text{Ni}^{\cdots\prime\prime\prime}\text{Br} \\ \text{Cl} \quad \text{Cl} \end{array} \right]^{2-}$$

58. What is the correct name for $K_4[Fe(CN)_6]$?

A. Heptacyanoferrous potassium

B. Heptacyanomonoferrouspotassium(IV)

C. Potassium(IV) hexacyanoferrate

D. Potassium hexacyanoferrate(II)

59. Which of the following are optically active?

A. $[Co(NH_3)_6)]^{2+}$

B. $[Co(en)_3]^{2+}$

C. $[NiCl_4]^{2-}$ (square planar)

D. $[Fe(CO)_4Cl_2]^{+}$

60. In water, $[Fe(CN)_6]^{3-}$ forms a lemon-yellow solution while a $[FeF_6]^{3-}$ solution is colorless. Which of the following statements is true?

A. $[Fe(CN)_6]^{3-}$ complex ions absorb photons in the purple region of the visible light spectrum and are diamagnetic.

B. $[Fe(CN)_6]^{3-}$ complex ions absorb photons in the yellow region of the visible spectrum and are paramagnetic.

C. $[FeF_6]^{3-}$ complex ions absorb photons in the infrared region of the electromagnetic spectrum and are paramagnetic.

D. $[FeF_6]^{3-}$ complex ions absorb photons in the ultraviolet region of the electromagnetic spectrum and are diamagnetic.

CHE 107 SPRING 2010 Final Exam Key

1. D
2. C
3. A
4. A
5. A
6. D
7. D
8. C
9. A
10. B
11. B
12. C
13. B
14. A
15. B
16. A
17. C
18. C
19. D
20. B
21. B
22. C
23. A
24. B
25. D
26. D
27. C
28. B
29. C
30. D
31. C
32. C
33. A
34. C
35. D
36. B
37. D
38. B
39. D
40. D
41. D
42. C
43. B
44. A
45. D
46. C
47. A
48. A
49. D
50. A

51. B
52. A
53. C
54. A
55. B
56. A
57. B
58. D
59. B
60. C