

NAME (block print) _____

CHEMISTRY 102

FALL 2007

FINAL EXAM

FORM A

Section 501

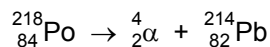
DR. KEENEY-KENNICUTT

- Directions:
- (1) Put your name on the top of this page.
 - (2) Each multiple choice question is actually 2 questions on your scanning sheet. If you are sure of an answer, circle it. If you cannot decide between two answers, circle both of them. If you get one correct you'll get half credit for 2.5 pts. If there is an ambiguous multiple choice question, use the last page to explain your answer.
 - (3) The last page is a copy of the information on exam envelopes.
 - (4) There are 15 questions.
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Please read and sign: "On my honor, as an Aggie, I have neither given nor received unauthorized aid on this exam." _____

- 1&2.** In any electrochemical cell, oxidation always occurs at the:
- (a) cathode (b) anode (c) inert electrode (d) S.H.E. (e) metal electrode

- 3&4.** Polonium has many isotopes including polonium-218 which decays with a half-life of 3.05 minutes to Pb-214:



Consider a 20.0 g sample of polonium-218. How many grams would remain in the sample after 17 minutes?

- (a) 2.5 g (b) 1.4 g (c) 0.21 g (d) 0.60 g (e) 0.42 g
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- 5&6.** If a solution is 1.0×10^{-3} M in Ca^{2+} and 1.0×10^{-4} M in CO_3^{2-} , will precipitation occur?
- (a) Yes, because $Q_{sp} > K_{sp}$
(b) Yes, because $K_{sp} > Q_{sp}$
(c) No, because $Q_{sp} > K_{sp}$
(d) No, because $K_{sp} > Q_{sp}$
(e) cannot be determined

7&8. How much time (in hours) is required to plate out 5.00 g of copper metal from a solution of $\text{Cu}(\text{NO}_3)_2$ when the current is 3.00 amperes?

- (a) 1.87 hr (b) 1.09 hr (c) 1.41 hr (d) 3.45 hr (e) 0.94 hr

9&10. What must be the hydroxide concentration to initiate precipitation of $\text{Cu}(\text{OH})_2$ ($K_{\text{sp}} = 1.6 \times 10^{-19}$) from a solution that is 0.00060 M in Cu^{2+} ions 25°C?

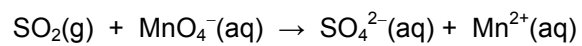
- (a) 2.0×10^{-9} M (b) 1.0×10^{-12} M (c) 3.2×10^{-16} M
(d) 1.6×10^{-8} M (e) 3.5×10^{-14} M

11. Do the on-line assessment of our course. The directions were sent to your neo account. Completion by Monday will give you 5 pts on this final.

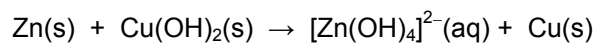
12. Do the assessment on the outside work we used in class this semester: BOPs, OWL and CPR. The assessment form was sent to your neo account as a pdf file and handed out in class. It is due on Monday in my office (you can slide it under my door if I'm not there). Completion will give you 5 pts on this final.

- (4 pts) **13.** (a) Draw the voltaic cell that results when the following two half-cells are connected:
(1) an iron electrode is inserted into a solution of 1.00 M Fe^{2+} ions.
(2) a silver electrode is inserted into a solution of 1.00 M Ag^+ ions.
- (2 pts) (b) Which is the anode and what is the anodic reaction?
- (2 pts) (c) Which is the cathode and what is the cathodic reaction?
- (1 pts) (d) What is the sign on each electrode?
- (1 pts) (e) Show the direction of the electron flow.
- (2 pts) (f) What is the overall reaction?
- (1 pt) (g) Do you expect the E° of this cell to be positive or negative (circle the right answer)
- (1 pt) (h) Do you expect the ΔG° for the reaction to be positive or negative (circle the right answer)
- (1 pt) (i) Do you expect K_{thermo} for the reaction to be very large or very small (circle the right answer)

(3 pts) **14.** (a) Balance the following redox reaction in acidic solution (use any method you wish):



(3 pts) (b) Balance the following redox reaction in basic solution (use any method you wish):



(4 pts) **15.** Calculate the potential of this non-standard cell: $\text{Al}|\text{Al}^{3+}(0.0010 \text{ M})||\text{Cu}^{2+}(0.10 \text{ M})|\text{Cu}$

$$E = E^{\circ} - 0.0592/n \log Q \quad \text{or} \quad E = E^{\circ} - 0.0257/n \ln Q$$

SCRAP PAPER OR COMMENTS ON THIS EXAM
