To get the most out of this Practice Exam:

- Feel free to use a periodic table, scrap paper, and a non-programmable calculator, but do not use your textbook or lecture notes.
- Set a timer for 50 minutes (the amount of time you'll have for the exam). When the time is up, grade yourself using the **Answer Key** on page 7. It is important to get a sense of the length of time you'll have for the exam. If you are doing well on the questions you complete, but aren't getting to the end of the practice exam, see if you can find areas where you can speed up by practicing.
- Each question is worth 5 pts. If you earn < 73% (less than a "C") you are not yet ready to pass Exam #2.
- Complete the **Practice Exam – Self Reflection** on page 8. It will help you identify your strength/weaknesses and possible resources for getting help.
- Print out one copy of **Practice Exam – Correction Template** on page 9 for each question you get wrong. Use the space on the page to analyze your mistake.
- Get help and/or extra practice with questions you don't understand.

Soluble salts include:	
• All Li^+, Na^+, K^+, NH_4^+, NO_3^- and $C_2H_3O_2^-$	
• All SO_4^{2-}	except: Ca^{2+}, Sr^{2+}, Ba^{2+}, Pb^{2+}
• All Cl^-, Br^-, and I^-	except: Ag^+, Pb^{2+}, Hg_2^{2+}
Insoluble salts include:	
• All PO_4^{3-} and CO_3^{2-}	except: Li^+, Na^+, K^+, and NH_4^+
• All OH^- and S^{2-}	except: Li^+, Na^+, K^+, NH_4^+, Ca^{2+}, Sr^{2+}, and Ba^{2+}

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1) What is the molar mass (in g/mol) of chromium(III) nitrate?
A) 210.01 **B)** 153.03 **C)** 114.01 **D)** 186.03 **E)** 82.01 **F)** 238.03

2) What is the coefficient in front of the $H_2O(g)$ when the following reaction is balanced?

_____ $C_4H_{10}(g)$ + _____ $O_2(g)$ → _____ $CO_2(g)$ + _____ $H_2O(g)$

A) 6 **B)** 9 **C)** 10 **D)** 4 **E)** 13 **F)** 8

3) What is the mass % of F in CuF_2?
A) 37.42% **B)** 18.71% **C)** 31.22% **D)** 29.90% **E)** 15.18 **F)** 43.63%

4) How many atoms are there in a 4.5 g sample of water? **Note:** 1 mol = 6.02×10^{23} things
A) 8.1×10^{24} **B)** 4.5×10^{23} **C)** 2.7×10^{24} **D)** 3.0×10^{23} **E)** 6.3×10^{23} **F)** 1.5×10^{23}

5) AgCl is often used in silver plating and contains 75.27% Ag by mass. Calculate the mass of AgCl required to plate 155 mg of pure silver?
A) 2.06 g **B)** 206 g **C)** 117 g **D)** 0.206 g **E)** 0.117 g **F)** 1.17 g

6) What is the coefficient in front of the $H_2O(l)$ when the following reaction is balanced? "solid ammonium nitrate decomposes to produce gaseous nitrogen, gaseous oxygen, and liquid water"
A) 4 **B)** 2 **C)** 1 **D)** 6 **E)** 5 **F)** 3

7) What is the mass of 0.55 mol of Al?
A) 0.55 g **B)** 1.8 g **C)** 5.9 g **D)** 22 g **E)** 15 g **F)** 0.020 g

8) Nicotine is 74.03% C, 8.70% H, and 17.27% N. What is the empirical formula for nicotine?
A) C_2H_5N **B)** C_5H_7N **C)** $C_3H_7N_2$ **D)** $C_5H_3N_3$ **E)** CH_5N_5 **F)** $C_2H_7N_3$

9) A 6.15 g sample of bromine reacts fluorine to form a 13.50 g sample of a bromine-fluorine compound. What is the empirical formula of the compound?
A) Br_5F **B)** BrF_9 **C)** Br_3F_4 **D)** BrF_5 **E)** Br_4F_{37} **F)** BrF_3

10) What is the formula of the solid that is formed when an aqueous solution of ammonium phosphate is added to an aqueous solution of iron(II) acetate?
A) $(NH_4)_3PO_4$ **B)** $Fe(C_2H_3O_2)_2$ **C)** $Fe(NH_4)_2$
D) $FePO_4$ **E)** $NH_4C_2H_3O_2$ **F)** $Fe_3(PO_4)_2$

11) What is the coefficient in front of the $Co_2O_3(s)$ when the following reaction is balanced?

_____ $Co_2O_3(s)$ + _____ $C(s) \rightarrow$ _____ $Co(s)$ + _____ $CO_2(g)$

A) 2 **B)** 3 **C)** 5 **D)** 6 **E)** 1 **F)** 4

12) Which of the following has the greatest mass percent N?

A) NO **B)** HNO_2 **C)** NO_3 **D)** NH_3 **E)** HNO_3 **F)** N_2O_4

13) A compound is found to have the empirical formula of C_2HCl and a molar mass of 181.44 g/mol. What is the molecular formula for the compound?

A) $C_8H_4Cl_4$ **B)** $C_3H_4Cl_4$ **C)** $C_6H_3Cl_3$ **D)** C_2HCl **E)** $C_4H_2Cl_2$ **F)** $C_9H_3Cl_2$

14) What is the net ionic reaction when aqueous $Sr(C_2H_3O_2)_2$ reacts with aqueous Na_3PO_4?

A) $Na^+(aq) + C_2H_3O_2^-(aq) \rightarrow NaC_2H_3O_2(s)$

B) $3\ Sr^{+2}(aq) + 2\ PO_4^{3-}(aq) \rightarrow Sr_3(PO_4)_2(s)$

C) $2\ Sr^{+2}(aq) + 3\ PO_4^{3-}(aq) \rightarrow Sr_2(PO_4)_3(s)$

D) $3\ Sr^{+2}(aq) + 2\ PO_4^{3-}(aq) \rightarrow Sr_3(PO_4)_2(aq)$

E) $3\ Na^+(aq) + PO_4^{3-}(aq) \rightarrow Na_3PO_4(s)$

F) $Sr^{+2}(aq) + 2\ C_2H_3O_2^-(aq) \rightarrow Sr(C_2H_3O_2)_2(s)$

15) How many moles are there in 10.5 g of calcium carbonate?

A) 0.154 **B)** 1.05×10^3 **C)** 10.5 **D)** 15.4 **E)** 715 **F)** 0.105

16) Which of the following compounds is not expected to be soluble in water?

A) $LiNO_3$ **B)** Na_3PO_4 **C)** $(NH_4)_2CO_3$ **D)** $PbCl_2$ **E)** CaS **F)** $AgC_2H_3O_2$

17) A sample of $Ba_3(PO_4)_2$ contains 14.5 g of O. How many g of Ba are in the sample?

A) 332 **B)** 1.69 **C)** 46.7 **D)** 124 **E)** 0.634 **F)** 4.51

18) Which pair of descriptions applies to the following reaction:

$$2HF(aq) + Ca(OH)_2(aq) \rightarrow 2H_2O(l) + CaF_2(aq)$$

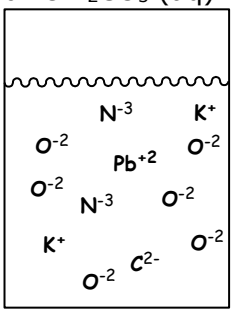
A) acid-base; single displacement **B)** oxidation-reduction; synthesis
C) combustion; decomposition **D)** acid-base; double displacement
E) precipitation; gas forming **F)** oxidation-reduction; synthesis

19) How many molecules of ethanol (C_2H_5OH) are present in 0.145 L of ethanol? The density of ethanol is 0.789 g/cm^3. Note: 1 L = 1000 cm^3

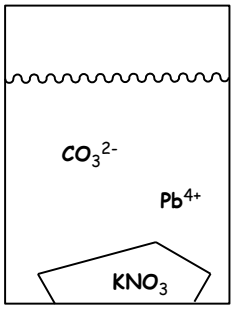
A) 1.50×10^{24} **B)** 1.89×10^{24} **C)** 6.89×10^{25}
D) 1.03×10^{25} **E)** 3.57×10^{24} **F)** 1.50×10^{21}

20) Which of the following beakers is the best representation for what happens when you combine K_2CO_3 (aq) with $Pb(NO_3)_4$?

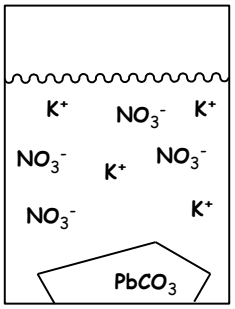
A)



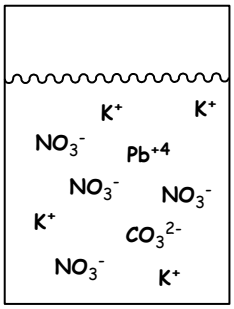
B)



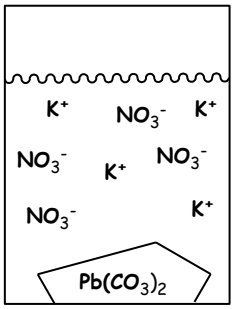
C)



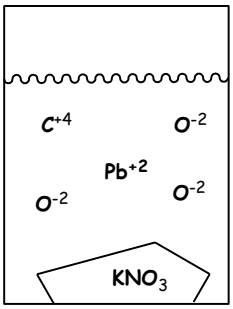
D)



E)



F)



Answer key: each question is worth 5 points

1) F	5) D	9) D	13) C	17) C
2) C	6) A	10) F	14) B	18) D
3) A	7) E	11) A	15) F	19) A
4) B	8) B	12) D	16) D	20) E

Practice Exam – Self Reflection

A) What grade did you earn on this practice exam?

B) Are you satisfied with your grade on this practice exam? YES _____ NO _____

C) What is your current grade in CHEM 4? (check Canvas)

D) Are you satisfied with your current grade in CHEM 4? YES _____ NO _____

E) Why do you think you made mistakes on this practice exam? *[Check all that apply.]*

- ☐ Did not study enough
- ☐ Difficulty with the mathematics
- ☐ Did not understand the concepts
- ☐ Felt rushed during the exam
- ☐ Family/personal issues
- ☐ Other (explain):
- ☐ Unfamiliar with terminology
- ☐ Difficulty applying the concept to new contexts
- ☐ Careless mistakes
- ☐ Thought I knew the material better than I did
- ☐ Test anxiety/panicked

F) Which of these resources have you been taking advantage of? *[Check all that apply.]*

- ☐ PAL sessions
- ☐ PAL leader office hours
- ☐ Instructor office hours
- ☐ Commit to Study mentoring
- ☐ Review posted clicker questions
- ☐ Study groups
- ☐ Practice exams
- ☐ Optional *MasteringChemistry* homework
- ☐ PARC tutoring
- ☐ Other (explain):

G) Discuss your weakness and strengths in terms of your study skills and how you approached the class up until taking this practice exam and discuss any changes you plan on making moving forward.

a. Strengths:

b. Weaknesses:

c. Changes you plan on making (be as specific as possible):

Practice Exam – Correction Template

(print out 1 copy of this template for each question you got wrong)

1) What question # from the practice exam are you correcting?

2) What concepts are being dealt with in the question? In other words, what type of problem is it?

3) Where in your textbook (what page) and when in your lecture notes (what date) is this type of problem dealt with?

Part I: Working a similar problem to the one you got wrong

4) Write out a similar problem and all the work needed for you to fully understand it. [Continue on back as needed.]

Part II: Correcting the problem you got wrong

5) Write out the question that you got wrong and all the work needed for you to fully understand it. Include clarifying/explanatory comments. [Continue on back as needed.]