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 5. 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 6. 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 7 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 of lead(IV) sulfate?

A) 399.34 g/mol **B)** 399.3 g/mol **C)** 399 g/mol
D) 390 g/mol **E)** 400 g/mol **F)** 4.0×10^2 g/mol

2) Which of the following has the greatest mass percent of N? You should be able to do this problem without using your calculator.

A) HNO_2 **B)** NO **C)** NO_3
D) NH_3 **E)** HNO_3 **F)** NO_2

3) Decane ($C_{10}H_{22}$) is a flammable liquid. Write the balanced combustion reaction for decane using only whole numbers. What is the coefficient in front of the O_2 in the balanced reaction?

A) 16.5 **B)** 21 **C)** 10.5
D) 8 **E)** 31 **F)** 16

4) What pair of descriptions correctly applies to the reaction: $2\ Rb(s) + Br_2(g) \rightarrow 2\ RbBr(s)$

A) precipitation and synthesis **B)** combustion and decomposition
C) acid-base and decomposition **D)** redox and synthesis

5) How many atoms are there in a 15.0-g sample of KBr? Note: 1 mol = 6.022×10^{23}

A) 1.52×10^{23} **B)** 9.90×10^{22} **C)** 3.80×10^{22}
D) 2.15×10^{27} **E)** 7.59×10^{22} **F)** 4.18×10^{-25}

6) What is the coefficient in front of the N_2 when the following reaction is balanced?

_____ $N_2H_4(g)$+ _____ $N_2O_4(g) \rightarrow$ _____ $N_2(g)$ + _____ $H_2O(g)$

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

7) Write the net ionic equation for the reaction between $HNO_3(aq)$ and $NaOH(aq)$. Note that $HNO_3(aq)$ is a strong acid.

A) $HNO_3(aq) + NaOH(aq) \rightarrow H_2O(l) + NaNO_3(aq)$
B) $H^+(aq) + NO_3^-(aq) + Na^+(aq) + OH^-(aq) \rightarrow H_2O(l) + Na^+(aq) + NO_3^-(aq)$
C) $H^+(aq) + NO_3^-(aq) + Na^+(aq) + OH^-(aq) \rightarrow H^+(aq) + OH^-(aq) + NaNO_3(s)$
D) $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$
E) $H^+(aq) + NO_3^-(aq) + Na^+(aq) + OH^-(aq) \rightarrow H_2O(l) + NaNO_3(s)$
F) No reaction: everything is a spectator ion

8) What is the mass of 8.5 mol of Li?

A) 0.50 g **B)** 5.1×10^{24} g **C)** 1.2 g
D) 1.4×10^{-23} g **E)** 59 g **F)** 82 g

9) Which of the following is not expected to react with HCl(aq) to form a gas?

A) $KHCO_3$ **B)** K_2S **C)** K_2CO_3
D) K_2SO_4 **E)** K_2SO_3 **F)** they will all form gas

10) A sample of an unknown compound contains 66.62% C, 7.47% H, and 25.91% N. If the molar mass of the compound is roughly 110 g/mol, what is the molecular formula of this compound?

A) C_3H_4N **B)** $C_5H_{20}N_2$ **C)** $C_7H_{10}N$
D) $C_7H_{14}N$ **E)** $C_6H_{12}N_2$ **F)** $C_6H_8N_2$

11) Which of the following statements is false?

A) Compounds that are insoluble do not dissolve in water.
B) All ionic compounds dissolve in water.
C) A precipitation reaction is when two aqueous solutions mix to form a solid.
D) A homogeneous mixture has the same composition throughout.
E) Solubility rules can be used to predict if a compound will dissolve in water.
F) Making an aqueous solution involves dissolving a substance in water.
G) Solutions of strong electrolytes can conduct electricity.

12) What is the mass % (to 3 sig figs) of O in Na_2CO_3?

A) 64.9% **B)** 21.6% **C)** 15.1%
D) 45.3% **E)** 41.8% **F)** 32.4%

13) What is the formula of the solid that is formed when an aqueous solution of zinc bromide is added to an aqueous solution of potassium sulfide?

A) KBr **B)** ZnS **C)** KS
D) Zn_2S **E)** $ZnBr_2$ **F)** K_2S

14) An aqueous solution of sodium phosphate reacts with an aqueous solution of nickel(II) chloride to produce aqueous sodium chloride and a precipitate of nickel(II) phosphate. What is the coefficient in front of the sodium chloride when this reaction is balanced?

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

15) A solution contains 1.50 g of dissolved Pb^{2+} ions. How many grams of NaI must be added to the solution to completely precipitate all of the dissolved Pb^{2+} as PbI_2?

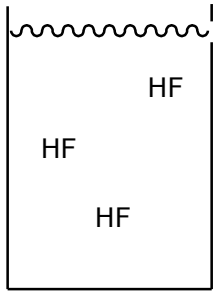
A) 2.17 g **B)** 0.543 g **C)** 3.82 g
D) 1.09 g **E)** 4.15 g **F)** 0.981 g

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

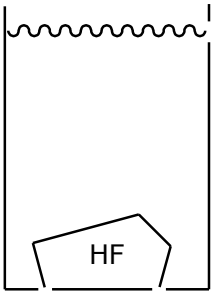
A) $FeCl_2$ **B)** $Co(NO_3)_3$ **C)** $(NH_4)_2C_2O_4$
D) $PbSO_4$ **E)** $Ca(OH)_2$

17) Hydrofluoric acid, HF(aq) is a weak acid. Which of the following drawings best represents the behavior of HF molecules in water?

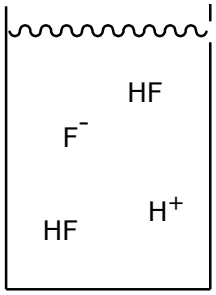
A)



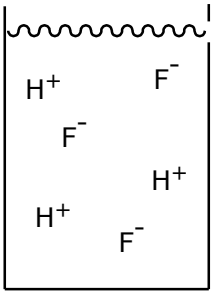
B)



C)



D)



18) A sample of $Ca(NO_3)_2$ has 5.00×10^{23} N atoms. How much does the sample weigh?

A) 273 g **B)** 136 g **C)** 2.53×10^{-3} g
D) 1.36×10^{48} g **E)** 66.0 g **F)** 68.1 g

19) What pair of descriptions correctly applies to the reaction:

$$HClO_4(aq) + KOH(aq) \rightarrow H_2O(l) + KClO_4(aq)$$

A) precipitation and synthesis **B)** combustion and displacement
C) acid-base and double displacement **D)** redox and decomposition

20) An electric current can be used to break water into its constituent elements according to the following balanced reaction. Which statement about this reaction is false?

$$2\ H_2O(l) \rightarrow 2\ H_2(g) + O_2(g)$$

A) All of the products that are produced are gases.
B) Writing "$2\ H_2O$" is different than writing "H_4O_2"
C) The total number of O atoms is the same before and after the reaction
D) 2 molecules of products can be produced from every 2 water molecules.
E) This reaction is balanced.

Answer key: Each question is worth 5 points

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

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 <u>and</u> 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.]