

Chemistry Distance Learning Packet – CP and Honors

- 1) Midterm Tic Tac Toe Assignments – Please complete the sheets for your class, **PAY ATTENTION TO THE HEADER ON EACH SHEET TO COMPLETE THE ONE FOR YOUR CLASS**
- 2) Midterm Study Review Questions (50 multiple choice): May be completed online through Microsoft Teams or on the hard copy.
- 3) Textbook Reference Sheets – A list of topics and page references for the CP Chemistry Textbook and Honors Chemistry Textbook
- 4) Workbook Reference Sheet – CP Only
- 5) Periodic Table and Equation Sheet
- 6) Instructions to access Microsoft Teams.
- 7) Instructions to Access the Online Textbook is posted in Teams and on Teachers' Websites

You are expected to complete 1 assignment per day. Each assignment should take approximately 60 minutes to complete. There are 9 total tic-tac-toe assignments (3 per unit covered so far) and one culminating assessment (the study review questions).

Rubric for The Tic-Tac-Toe: Each Grid is worth 100 points for an assignment total of 300 points. Point values for each assignment square is listed below:

| | | |
|----|----|----|
| 30 | 30 | 40 |
| 30 | 30 | 40 |
| 30 | 30 | 40 |

Office Hours for teachers:

Weekdays: 10-11am and 2-3pm

Email addresses:

Remind: To 81010 text the following:

Mrs. Bedard: sbedard@dorchester2.k12.sc.us

Remind: @bedardchem

Ms. Causey: mcausey@dorchester2.k12.sc.us

Remind: 1st: @d3f6h6 3rd: @3d84d9 4th: @9a65dg

Mr. Cook: edcook@dorchester2.k12.sc.us

Remind: @chemcooker

Mrs. Mellott: smellott@dorchester2.k12.sc.us

Remind: @chemellott

Ms. Ritchie: emritchie@dorchester2.k12.sc.us

Remind: @2ndsemhc

Sign in and get started with Teams

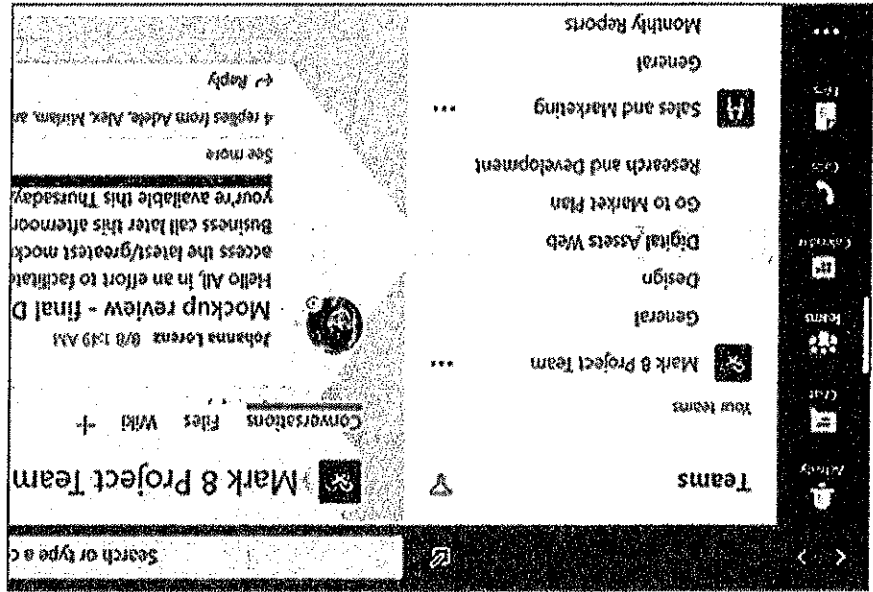
Go to <https://www.office.com/>

1. Sign in with your Office 365 username and password.
 - The student user name and password is there **PowerSchool information**. The same information used to login to computers at school.
 - For example: Username: **jsmith@dorchester2.k12.sc.us**
 - Password: Password

A *team* is a collection of people, conversations, files, and tools — all in one place. A *channel* is a discussion in a team, dedicated to a department, project, or topic.

The best way to get familiar with teams and channels is to pick a team and channel and start exploring!

1. Select **Teams** on the left side of the app and then pick a team.
2. Select a channel and explore the **Conversations**, **Files**, and other tabs.



CP CHEM MIDTERM TIC TAC TOE REVIEW

Choose **three** assignments from the tic-tac-toe board below. You must choose one assignment from each row and one assignment from each column
UNIT ONE TOPICS: Lab Safety, Accuracy and Precision, Significant Figures, Density, Measurement, Classification of Matter, Properties and Changes of Matter

| | | |
|--|---|--|
| <p>Create a vocabulary list of 15 terms from the unit. Give the term, definition, and example</p> <p>Vocabulary terms are listed in the margins at the beginning of each section in textbook and highlighted in the text as well.</p> <p>Chapters by topic are listed on the Textbook Reference Sheet</p> | <p>Create a visual including 5 vocabulary terms from the unit in one graphic</p> <p>Visual may be print or digital. Options: infographic, PowToon, comic strip, Flipbook etc</p> | <p>Create and record yourself giving a 5 minute lesson on the topic to someone - or -create a narrated PowerPoint or YouTube video</p> |
| <p>Make a poster – it can be as colorful and creative as you like. It must include at least 1 vocabulary term from the unit and have a visual example to explain it.</p> | <p>Write a story using a topic from the unit</p> <p>Role: Who or what are you as the writer for example: student, a teacher, a chemist, a public/history figure like Mendeleev</p> <p>Choose 1 audience from the following: 1) early elementary aged child 2) grandparent 3) peer</p> <p>Format: Written clearly or typed</p> | <p>Create a total of 10 questions including at least 5 that have real world/cultural examples with an answer key</p> <p>Use the midterm study guide questions as examples to format multiple choice questions. You may also write short answer and word problems.</p> |
| <p>Watch the assigned video(s) and write thorough notes: https://www.youtube.com/watch?v=VRWRmlEHr3A</p> <p>https://www.gpb.org/chemistry-matters/unit-2/properties-of-matter</p> <p>https://www.gpb.org/chemistry-matters/unit-2/chemical-properties</p> <p>https://www.youtube.com/watch?v=b38hFWvEjwI</p> <p>https://www.youtube.com/watch?v=pWZlICXw3Ng</p> | <p>Write a school appropriate song, rap or create a tic tok to demonstrate, teach or review a topic in the unit</p> <p>Submit it in print or with a link to the online access</p> | <p>Read the relevant chapter(s) for the unit and write your own thorough notes or complete the assigned pages in the Reading and Study workbook that you were given in class.</p> <p>Chapters by topic are listed on the Textbook Reference Sheet</p> <p>Reading and Study Workbook assignments are listed on the Assignment Sheet</p> <p>To access textbook online see directions "Student Accessing..." Remember your username is your Powerschool username followed by @dorchester2.k12.sc.us</p> |

CP CHEM MIDTERM TIC TAC TOE REVIEW

Choose **three** assignments from the tic-tac-toe board below. You must choose one assignment from each row and one assignment from each column
UNIT 2 Topics: Periodic Table basics, Organization of the Atom, Naming ionic and molecular compounds, Balancing Equations, Types of Reactions, Predicting Products

| | | |
|--|---|--|
| <p>Create a vocabulary list of 15 terms from the unit. Give the term, definition, and example</p> <p>Vocabulary terms are listed in the margins at the beginning of each section in textbook and highlighted in the text as well.</p> <p>Chapters by topic are listed on the Textbook Reference Sheet</p> | <p>Create a visual including 5 vocabulary terms from the unit in one graphic</p> <p>Visual may be print or digital. Options: infographic, PowToon, comic strip, Flipbook etc</p> | <p>Create and record yourself giving a 5 minute lesson on the topic to someone - or -create a narrated PowerPoint or YouTube video</p> |
| <p>Make a poster – it can be as colorful and creative as you like. It must include at least 1 vocabulary term from the unit and have a visual example to explain it.</p> | <p>Write a story using a topic from the unit</p> <p>Role: Who or what are you as the writer for example: student, a teacher, a chemist, a public/history figure like Mendeleev</p> <p>Choose 1 audience from the following: 1) early elementary aged child 2) grandparent 3) peer</p> <p>Format: Written clearly or typed</p> | <p>Create a total of 10 questions including at least 5 that have real world/cultural examples with an answer key</p> <p>Use the midterm study guide questions as examples to format multiple choice questions. You may also write short answer and word problems.</p> |
| <p>Watch the assigned video(s) and write thorough notes: https://www.youtube.com/watch?v=t_f8bB1kf6M</p> <p>https://www.youtube.com/watch?v=nijb6UMvZuE</p> <p>https://www.gpb.org/chemistry-matters/unit-5/balancing-equations</p> <p>https://www.gpb.org/chemistry-matters/unit-5/types-of-reactions</p> <p>https://www.gpb.org/chemistry-matters/unit-5/reactivity-and-predicting-products</p> | <p>Write a school appropriate song, rap or create a tic tok to demonstrate, teach or review a topic in the unit</p> <p>Submit it in print or with a link to the online access</p> | <p>Read the relevant chapter(s) for the unit and write your own thorough notes or complete the assigned pages in the Reading and Study workbook that you were given in class.</p> <p>Chapters by topic are listed on the Textbook Reference Sheet</p> <p>Reading and Study Workbook assignments are listed on the Assignment Sheet</p> <p>To access textbook online see directions "Student Accessing..." Remember your username is your Powerschool username followed by @dorchester2.k12.sc.us</p> |

Choose three assignments from the tic-tac-toe board below. You must choose one assignment from each row and one assignment from each column
Unit Three Topics: The Mole, Percent Composition, Mole Ratios, Mole Conversions, Stoichiometry

| | | | |
|---|---|--|--|
| <p>Create a vocabulary list of 15 terms from the unit. Give the term, definition, and example</p> <p>Vocabulary terms are listed in the margins at the beginning of each section in textbook and highlighted in the text as well.</p> <p>Chapters by topic are listed on the Textbook Reference Sheet</p> | <p>Create a visual including 5 vocabulary terms from the unit in one graphic</p> <p>Visual may be print or digital. Options: infographic, PowerPoint, comic strip, Flipbook etc</p> | <p>Write a story using a topic from the unit</p> <p>Create a total of 10 questions including at least 5 that have real world/cultural examples with an answer key</p> <p>Use the midterm study guide questions as examples to format multiple choice questions. You may also write short answer and word problems.</p> <p>Format: Written clearly or typed</p> | <p>Read the relevant chapter(s) for the unit and write your own thorough notes or complete the assigned pages in the Reading and Study workbook that you were given in class.</p> <p>Chapters by topic are listed on the Textbook Reference Sheet</p> <p>Reading and Study Workbook assignments are listed on the Assignment Sheet</p> <p>To access textbook online see directions "Student Accessing..." Remember your username is your Powerschool username followed by @dorchester2.k12.sc.us</p> |
| <p>Make a poster – it can be as colorful and creative as you like. It must include at least 1 vocabulary term from the unit and have a visual example to explain it.</p> <p>Role: Who or what are you as the writer for example: student, a teacher, a chemist, a public/history figure like Mendeleev</p> <p>Choose 1 audience from the following: 1) carly elementary aged child 2) grandparent 3) peer</p> <p>Format: Written clearly or typed</p> | <p>Write a school appropriate song, rap or create a tie tock to demonstrate, teach or review a topic in the unit</p> <p>Submit it in print or with a link to the online access</p> | <p>Write a school appropriate song, rap or create a tie tock to demonstrate, teach or review a topic in the unit</p> <p>Submit it in print or with a link to the online access</p> | <p>Write a school appropriate song, rap or create a tie tock to demonstrate, teach or review a topic in the unit</p> <p>Submit it in print or with a link to the online access</p> |
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HONORS CHEMISTRY MODERN IIC FACTOR REVIEW

Refer to the instruction sheet for how to complete these assignments. You will do nine assignments total (3 for each overarching unit!).

| | | |
|--|---|--|
| <p>Create a vocabulary list of 15 terms from the unit. Give the term, definition, and example.</p> <p>Chapters by topic are listed on the "Honors Chemistry Unit Reference Sheet".</p> <p>You may use your notes, the textbook readings, or videos provided to cover the Unit 1 topics listed above.</p> | <p>Create a visual including 5 vocabulary terms from the unit in one graphic.</p> <p>Visual may be print or digital. Options: infographic, PowToon, comic strip, Flipbook etc.</p> | <p>Create and record yourself giving a 5 minute lesson on the topic to someone - or -create a narrated PowerPoint or YouTube video</p> |
| <p>Make a poster – it can be as colorful and creative as you like. It must include at least 1 vocabulary term from the unit and have a visual example to explain it.</p> | <p>Write a story using a topic from the unit</p> <p>Role: Who or what are you as the writer for example: student, a teacher, a chemist, a public/history figure like Mendeleev</p> <p>Choose 1 audience from the following: 1) early elementary aged child 2) grandparent 3) peer</p> <p>Format: Written clearly or typed</p> | <p>Create a total of 10 questions including at least 5 that have relevant real world/cultural examples.</p> <p>At least 5 of these questions should be free response.</p> <p>You also need to include a key with worked out solutions to all problems. All work must be shown.</p> |
| <p>Watch the assigned video(s) on the "Honors Chemistry Unit Reference Sheet" and write thorough notes.</p> | <p>Write a school appropriate song, rap or create a talk to demonstrate, teach or review a topic in the unit</p> <p>Submit it in print or with a link to the online access</p> | <p>Read the relevant chapter(s) for the unit and write your own thorough notes or complete the assigned pages in the Reading and Study workbook that you were given in class.</p> <p>Chapters by topic are listed on the</p> <p>To access textbook online refer to remind for login information.</p> |

Honors Chemistry Unit Reference Sheet

Lab Safety 101

TOPICS: lab safety, accuracy and precision, significant figures, density, measurement, classification of matter, properties and changes of matter

Lab Safety --15 T and 22 T-front of textbook <https://www.youtube.com/watch?v=g13DeFY0ctw>

Units, Density, Scientific Notation: pg. 32-39 <https://www.youtube.com/watch?v=7tVeb13TSsg>

-Accuracy and Precision/ Error/ Significant Figures: pg. 47-54 <https://www.youtube.com/watch?v=b38hFWVEIwI>

-Classification of Matter; physical and Chemical properties and changes; Mixtures: pg. 70-87

<https://www.youtube.com/watch?v=pWZiICXw3Ng>

-Parts of Atoms; Isotopes: pg. 115-121 <https://www.youtube.com/watch?v=55ddZulPhtg>

Naming Compounds and Chemical Reactions

Topics: periodic table basics, organization of the atom, naming ionic and molecular compounds, balancing equations,

types of reactions, predicting products

-Ionic Naming/ Compounds: pg. 206-224

<https://www.youtube.com/watch?v=WwC3k2723IM>

<https://www.youtube.com/watch?v=Qf07-8JhnpC>

<https://www.youtube.com/watch?v=5EwmedLURkmw&list=PLZ6mfAs08HCbX61SrGVM1D!DshASBUQd&index=2>

<https://www.youtube.com/watch?v=Rq0A-AHdB74>

-Covalent Naming/ Covalent: pg. 248-252

<https://www.youtube.com/watch?v=PKA4CZwbZWU>

<https://www.youtube.com/watch?v=DejKvR4pRkx>

-Chemical Reactions: pg. 282-307

Types <https://www.youtube.com/watch?v=z0187f8gqfU>

Predicting products <https://www.youtube.com/watch?v=FUoMfBpYyWU>

Balancing equations <https://www.youtube.com/watch?v=eNsVaUCzVIA>

Mole Calculations and Stoichiometry

Topics: the mole, percent composition, mole ratios, mole conversions, stoichiometry

-Chapter 10 The Mole: pg. 318-355

-Chapter 11 Stoichiometry: pg. 366-389

<https://www.youtube.com/watch?v=WQ1-35dq50g&list=PLyTGGfInD9dVvnoTUBokUD-2CqC0hous&index=13>



The periodic table

www.webelements.com

| | | | | | | | | | | | | | | | | | | |
|---|---|--|--|---|---|--|---|---|--|--|---|---|---|---|---|---|--|---|
| 1 Hydrogen H 1.008 | 2 Helium He 4.0026 | 3 Lithium Li 6.94 | 4 Beryllium Be 9.0122 | 5 Boron B 10.81 | 6 Carbon C 12.011 | 7 Nitrogen N 14.007 | 8 Oxygen O 15.999 | 9 Fluorine F 18.998 | 10 Neon Ne 20.180 | 11 Sodium Na 22.990 | 12 Magnesium Mg 24.305 | 13 Aluminum Al 26.982 | 14 Silicon Si 28.085 | 15 Phosphorus P 30.974 | 16 Sulfur S 32.06 | 17 Chlorine Cl 35.45 | 18 Argon Ar 39.948 | |
| 19 Potassium K 39.098 | 20 Calcium Ca 40.078(4) | 21 Scandium Sc 44.956 | 22 Titanium Ti 47.867 | 23 Vanadium V 50.942 | 24 Chromium Cr 51.996 | 25 Manganese Mn 54.938 | 26 Iron Fe 55.845(2) | 27 Cobalt Co 58.933 | 28 Nickel Ni 58.693 | 29 Copper Cu 63.546(3) | 30 Zinc Zn 65.39(2) | 31 Gallium Ga 69.723 | 32 Germanium Ge 72.630(8) | 33 Arsenic As 74.922 | 34 Selenium Se 78.971(8) | 35 Bromine Br 79.904 | 36 Krypton Kr 83.798(2) | |
| 37 Rubidium Rb 85.468 | 38 Strontium Sr 87.62 | 39 Yttrium Y 88.906 | 40 Zirconium Zr 91.224(2) | 41 Niobium Nb 92.906(2) | 42 Molybdenum Mo 95.95 | 43 Technetium Tc [98.906] | 44 Ruthenium Ru 101.07(2) | 45 Rhodium Rh 102.91 | 46 Palladium Pd 106.42 | 47 Silver Ag 107.87 | 48 Cadmium Cd 112.41 | 49 Indium In 114.82 | 50 Tin Sn 118.71 | 51 Antimony Sb 121.76 | 52 Tellurium Te 127.60(3) | 53 Iodine I 126.90 | 54 Xenon Xe 131.29 | |
| 55 Cesium Cs 132.91 | 56 Barium Ba 137.33 | 57-70 Lanthanoids La-Lu [174.97] | 71 Hafnium Hf 178.49(2) | 72 Tantalum Ta 180.95 | 73 Tungsten W 183.84 | 74 Rhenium Re 186.21 | 75 Osmium Os 190.23(2) | 76 Iridium Ir 192.22 | 77 Platinum Pt 195.08 | 78 Gold Au 196.97 | 79 Mercury Hg 200.59 | 80 Thallium Tl 204.38 | 81 Lead Pb 207.2 | 82 Bismuth Bi 208.98 | 83 Polonium Po [208.98] | 84 Astatine At [208.98] | 85 Radon Rn [222.02] | |
| 87 Francium Fr [223.02] | 88 Radium Ra [226.02] | 89-102 Actinoids Ac-Th [227.03] | 103 Lawrencium Lr [262.11] | 104 Rutherfordium Rf [267.12] | 105 Dubnium Db [270.10] | 106 Seaborgium Sg [269.10] | 107 Bohrium Bh [270.10] | 108 Hassium Hs [277.10] | 109 Meitnerium Mt [276.10] | 110 Darmstadtium Ds [281.10] | 111 Roentgenium Rg [281.10] | 112 Copernicium Cn [285.10] | 113 Nihonium Nh [286.10] | 114 Flerovium Fl [289.10] | 115 Moscovium Mc [289.10] | 116 Livermorium Lv [293.10] | 117 Tennessine Ts [293.10] | 118 Oganesson Og [294.10] |

Key:
 Element Name
 Atomic number
Symbol
 Atomic weight (mean relative mass)

| | | | | | | | | | | | | | |
|---|--------------------------------------|---|--|---|--|--|--|--|--|--|---|---|---|
| Lanthanum 57 La 138.91 | Cerium 58 Ce 140.12 | Praseodymium 59 Pr 140.91 | Neodymium 60 Nd 144.24 | Promethium 61 Pm [144.91] | Samarium 62 Sm 150.36(2) | Europium 63 Eu 151.96 | Gadolinium 64 Gd 157.25(3) | Terbium 65 Tb 158.93 | Dysprosium 66 Dy 162.50 | Holmium 67 Ho 164.93 | Erbium 68 Er 167.26 | Thulium 69 Tm 168.93 | Ytterbium 70 Yb 173.05 |
| Actinium 89 Ac [227.03] | Thorium 90 Th 232.04 | Protactinium 91 Pa 231.04 | Uranium 92 U 238.03 | Nepthunium 93 Np [237.05] | Plutonium 94 Pu [244.05] | Americium 95 Am [243.06] | Curium 96 Cm [247.07] | Berkelium 97 Bk [247.07] | Californium 98 Cf [251.08] | Einsteinium 99 Es [252.09] | Fermium 100 Fm [257.10] | Mendelevium 101 Md [258.10] | Noelium 102 No [259.10] |

Symbols and names: the symbols and names of the elements, and their spellings are those recommended by the International Union of Pure and Applied Chemistry (IUPAC - <http://www.iupac.org/>). In some countries, the spellings aluminium, caesium, and sulphur are usual.

Group labels: the numeric system (1-18) used here is the current IUPAC convention.

Atomic weights (mean relative masses): these are the IUPAC 2013 values and given to 5 significant figures. The last significant figure of each value is considered reliable to ±1 except where a larger uncertainty is given in parentheses. IUPAC representative values are given for those elements having an atomic weight interval (H, Li, B, C, N, O, Si, S, Cl, Ti). Elements for which the atomic weight is listed within square brackets have no stable nuclides and are represented by the element's longest-lived isotope reported in the IUPAC 2013 values except ¹⁶O for which the value of ¹⁶O-99 given as that is the most commonly used isotope.

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Chemistry Equation Sheet

Key

| Variable | Meaning | Variable | Meaning | Variable | Meaning |
|----------|-----------------------------|----------------|-----------------|----------|-----------------------|
| c | Specific heat | m | Mass | S | Solubility |
| D | Density | m | Molality | ΔS | Change in entropy |
| Σ | "sum of" | n | Moles | t | Total time |
| ΔG | Change in Gibbs free energy | N | Final sample | T | Half-life |
| ΔH | Change in enthalpy | N ₀ | Original sample | T | Temperature |
| i | # ions in solution | P | Pressure | ΔT | Change in temperature |
| M | molarity | q | heat | V | volume |

| Variable | Meaning | Variable | Meaning |
|--|--|---|--|
| Measurement | | | |
| % error = $\frac{ \text{experimental value} - \text{accepted value} }{\text{accepted value}} \times 100$ | | | |
| Nuclear Chemistry | | | |
| $N = N_0 \left(\frac{1}{2}\right)^{\frac{t}{T}}$ | | | |
| Nuclear Radiation Types = $\alpha, \beta^-, \beta^+, \gamma, \text{neutron}, \text{positron}$ | | | |
| Solutions | | | |
| $M = \frac{\text{mol}}{\text{L}}$ | $\frac{S_1}{P_1} = \frac{S_2}{P_2}$ | $\Delta T_b = K_b \cdot m_i$ | $\frac{V_1}{T_1} = \frac{V_2}{T_2}$ |
| $m = \frac{\text{mol}}{\text{kg}}$ | $M_1 V_1 = M_2 V_2$ | $\Delta T_f = K_f \cdot m_i$ | $\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$ |
| % mass = $\frac{\text{mass solute}}{\text{mass solution}} \times 100$ | $R = 0.0821 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}}$ | $D = \frac{L}{\text{mol} \times K}$ | $PV = nRT$ |
| Calculations Using Chemical Formulas | | | |
| Avogadro's Number = $6.02 \times 10^{23} \frac{\text{particles}}{\text{mol}}$ | Standard Pressures = 1 atm, 101.3 kPa, 760 mm Hg | molar volume = $22.4 \frac{\text{L}}{\text{mol}}$ at STP | |
| Stoichiometry | | | |
| % yield = $\frac{\text{actual yield}}{\text{theoretical yield}} \times 100$ | rate = $\frac{(\text{molar mass})_B}{(\text{molar mass})_A}$ | Standard Temperature = 273 K | |
| Acids and Bases | | | |
| $\text{pH} = -\log[H^+]$ | $\text{pOH} = -\log[\text{OH}^-]$ | $\text{pH} + \text{pOH} = 14$ | $K_w = 1 \times 10^{-14} = [H^+][\text{OH}^-]$ |
| Thermodynamics and Kinetics | | | |
| $\Delta H_{\text{rxn}} = \sum \Delta H_f^\circ(\text{products}) - \sum \Delta H_f^\circ(\text{reactants})$ | $q = mc(\Delta T)$ | $q = \frac{(\Delta H)_{\text{rxn}}}{(\text{molar mass})}$ | $n_A M_A V_A = n_B M_B V_B$ |
| $\Delta G_{\text{sys}} = \Delta H_{\text{sys}} - T(\Delta S_{\text{sys}})$ | | | |

Table of Solubilities in Water

| Solubility Rules | acetate | | bromide | | carbonate | | chloride | | chromate | | hydroxide | | iodide | | nitrate | | phosphate | | sulfate | | sulfide | | | |
|---|--------------------|--------------------|-----------|--------------|----------------|------------|------------|----------|-----------|----------------|--------------|---------------|---------|--------------|----------------|-----------------|--------------|-----------|-----------|---------|---------|-------|-------|---|
| | 1-nearly insoluble | 2-slightly soluble | 3-soluble | 4-decomposes | 5-not isolated | 6-aluminum | 7-ammonium | 8-barium | 9-calcium | 10-copper (II) | 11-iron (II) | 12-iron (III) | 13-lead | 14-magnesium | 15-mercury (I) | 16-mercury (II) | 17-potassium | 18-silver | 19-sodium | 20-zinc | 21-ss | 22-ss | 23-ss | |
| 1. Most sodium, potassium, and ammonium compounds are soluble in water | ss | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s |
| 2. Most nitrates, acetates, and chlorates are soluble. | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s |
| 3. Most chlorides are soluble, except those of silver, mercury (I), and lead. Lead (II) chloride is soluble in hot water. | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s |
| 4. Most sulfates are soluble, except those of barium, strontium, and lead. | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s |
| 5. Most carbonates, phosphates, and silicates are insoluble, except those of sodium, potassium, and ammonium. | ss | ss | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s |
| 6. Most sulfides are insoluble, except those of calcium, strontium, sodium, potassium, and ammonium. | ss | ss | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s | s |

| Activity Series | | Polyatomic Ions | |
|--------------------------|---------------------------|--------------------|---|
| Metals | Nonmetals | Ammonium | (NH ₄) ⁺ |
| Li | Fluorine, F ₂ | Acetate | (C ₂ H ₃ O ₂) ⁻¹ |
| K | Chlorine, Cl ₂ | Carbonate | (CO ₃) ⁻² |
| Ba | Bromine, Br ₂ | Chlorite | (ClO ₂) ⁻¹ |
| Sr | Iodine, I ₂ | Chlorate | (ClO ₃) ⁻¹ |
| Ca | | Chromate | (CrO ₄) ⁻² |
| Na | | Cyanide | (CN) ⁻¹ |
| Mg | | Dichromate | (Cr ₂ O ₇) ⁻² |
| Al | | Hydrogen Carbonate | (HCO ₃) ⁻¹ |
| Zn | | Hydrogen phosphate | (HPO ₄) ⁻² |
| Fe | | Hydroxide | (OH) ⁻¹ |
| Ni | | Hypochlorite | (ClO) ⁻¹ |
| Sn | | Nitrate | (NO ₃) ⁻¹ |
| Pb | | Nitrite | (NO ₂) ⁻¹ |
| Hydrogen, H ₂ | | Perchlorate | (ClO ₄) ⁻¹ |
| Cu | | Permanganate | (MnO ₄) ⁻¹ |
| Hg | | Peroxide | (O ₂) ⁻² |
| Ag | | Phosphate | (PO ₄) ⁻³ |
| Au | | Sulfate | (SO ₄) ⁻² |
| | | Sulfite | (SO ₃) ⁻² |

Spring 2020 Mid term Review

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- Use the activity series of metals to complete a balanced chemical equation for the following single replacement reaction.
 $\text{Ag}(s) + \text{KNO}_3(aq) \rightarrow$
 - $\text{AgNO}_3 + \text{K}$
 - $\text{AgK} + \text{NO}_3$
 - AgKNO_3
 - No reaction takes place because silver is less reactive than potassium.
- A compound composed of cations and anions is called a(n) _____.
 - diatomic molecule
 - polar compound
 - covalent molecule
 - ionic compound
- Express the product of 2.2 mm and 5.00 mm using the correct number of significant digits.
 - 10 mm²
 - 11 mm²
 - 11.0 mm²
 - 11.00 mm²
- What is the formula unit of aluminum oxide?
 - AlO
 - Al₂O
 - AlO₃
 - Al₂O₃
- In the reaction $2\text{CO}(g) + \text{O}_2(g) \rightarrow 2\text{CO}_2(g)$, what is the ratio of moles of oxygen used to moles of CO₂ produced?
 - 1:1
 - 2:1
 - 1:2
 - 2:2
- How many molecules are in 2.10 mol CO₂?
 - 2.53×10^{24} molecules
 - 3.79×10^{24} molecules
 - 3.49×10^{-24} molecules
 - 1.26×10^{24} molecules
- Which of the following is a physical property?
 - explosive
 - combustible
 - melting point
 - ability to rust
- In the chemical equation $\text{H}_2\text{O}_2(aq) \rightarrow \text{H}_2\text{O}(l) + \text{O}_2(g)$, the O₂ is a _____.
 - catalyst
 - solid
 - product
 - reactant
- Which of the following involves a chemical change?
 - mixing
 - melting
 - grinding
 - decomposing
- Which of the following measurements contains two significant figures?
 - 0.004 00 L
 - 0.004 04 L
 - 0.004 44 L
 - 0.004 40 L
- What are the coefficients that will balance the skeleton equation below?
 $\text{N}_2 + \text{H}_2 \rightarrow \text{NH}_3$
 - 1, 1, 2
 - 1, 3, 3
 - 3, 1, 2
 - 1, 3, 2
- Which of the following elements exists as a diatomic molecule?
 - neon
 - lithium
 - nitrogen
 - sulfur
- In the chemical reaction in which sucrose is heated and decomposes to form carbon dioxide and water, which of the following is a reactant?
 - sucrose
 - carbon dioxide
 - water
 - heat
- How many moles of aluminum are needed to react completely with 1.2 mol of FeO?
 $2\text{Al}(s) + 3\text{FeO}(s) \rightarrow 3\text{Fe}(s) + \text{Al}_2\text{O}_3(s)$; The molar mass of FeO is 71.85 g/mol
 - 1.2 mol
 - 0.8 mol
 - 1.6 mol
 - 2.4 mol
- In a double-replacement reaction, the
 - products are always molecular.
 - reactants are two ionic compounds.
 - reactants are two elements.
 - products are a new element and a new compound.
- What is the formula unit of sodium nitride?
 - NaN
 - Na₂N
 - Na₃N
 - NaN₃
- What are the correct formulas and coefficients for the products of the following double-replacement reaction?
 $\text{KNO}_3 + \text{H}_3\text{PO}_4 \rightarrow$
 - $\text{Rb}(\text{PO}_4)_3 + \text{H}_2\text{O}$
 - $\text{RbPO}_4 + 2\text{H}_2\text{O}$
 - $\text{Rb}_3\text{PO}_4 + 3\text{H}_2\text{O}$
 - $\text{H}_3\text{Rb} + \text{PO}_4\text{OH}$
- Which group of measurements is the most precise? (Each group of measurements is for a different object.)
 - 2 g, 3 g, 4 g
 - 2.0 g, 3.0 g, 4.0 g
 - 2 g, 2.5 g, 3 g
 - 1 g, 3 g, 5 g
- What is the mass in grams of 5.90 mol C₈H₁₈?
 - 0.512 g
 - 19.4 g
 - 389 g
 - 673 g
- What is the percent composition of carbon, in heptane, C₇H₁₆?
 - 12%
 - 19%
 - 68%
 - 84%
- How many moles of CaBr₂ are in 5.0 grams of CaBr₂?
 - 2.5×10^{-2} mol
 - 4.2×10^{-2} mol
 - 4.0×10^1 mol
 - 1.0×10^3 mol
- The products of a combustion reaction include
 - water, carbon dioxide, and carbon monoxide.
 - hydrogen, water, and carbon dioxide.
 - hydrogen and carbon monoxide.
 - hydrogen and water.
- How many moles of tungsten atoms are in 4.8×10^{25} atoms of tungsten?
 - 8.0×10^2 moles
 - 8.0×10^1 moles
 - 1.3×10^{-1} moles
 - 1.3×10^{-2} moles
- When the following equation is balanced, what is the coefficient for HCl?
 $\text{Mg}(s) + \text{HCl}(aq) \rightarrow \text{MgCl}_2(aq) + \text{H}_2(g)$
 - 6
 - 3
 - 1
 - 2
- What is the measurement 111,009 mm rounded off to four significant digits?
 - 111 mm
 - 111.0 mm
 - 111.01 mm
 - 110 mm
- The equation below shows the decomposition of lead nitrate. How many grams of oxygen are produced when 11.5 g NO₂ is formed? The molar mass of NO₂ is 46.01 g/mol.
 $2\text{Pb}(\text{NO}_3)_2(s) \rightarrow 2\text{PbO}(s) + 4\text{NO}_2(g) + \text{O}_2(g)$
 - 1.00 g
 - 2.00 g
 - 2.88 g
 - 32.0 g

40. Which of the following compounds contains the Mn^{3+} ion?
 a. MnS
 b. MnH_2
 c. Mn_2O_3
 d. MnO
41. How are chemical formulas of binary ionic compounds generally written?
 a. cation on left, anion on right
 b. anion on left, cation on right
 c. Roman numeral first, then anion, then cation
 d. subscripts first, then ions
42. Select the correct formula for sulfur hexafluoride.
 a. S_2F_6
 b. F_6SO_3
 c. F_6S_2
 d. SF_6
43. The molar volume of a gas at STP occupies _____.
 a. 22.4 L
 b. 0°C
 c. 1 kilopascal
 d. 12 grams
44. What are the coefficients that will balance the skeleton equation below?
 $AlCl_3 + NaOH \rightarrow Al(OH)_3 + NaCl$
 a. 1, 3, 1, 3
 b. 3, 1, 3, 1
 c. 1, 1, 1, 3
 d. 1, 3, 3, 1
45. The complete combustion of which of the following substances produces carbon dioxide and water?
 a. C_8H_{18}
 b. K_2CO_3
 c. $CaHCO_3$
 d. NO
46. If a combination reaction takes place between rubidium and bromine, the chemical formula for the product is _____.
 a. $RbBr$
 b. Rb_2Br
 c. $RbBr_2$
 d. $RbBr$
47. In a chemical reaction, the mass of the products
 a. is less than the mass of the reactants.
 b. is greater than the mass of the reactants.
 c. is equal to the mass of the reactants.
 d. has no relationship to the mass of the reactants.
48. At STP, how many liters of oxygen are required to react completely with 3.6 liters of hydrogen to form water?
 $2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$
 a. 1.8 L
 b. 3.6 L
 c. 2.0 L
 d. 2.4 L
49. How many liters of hydrogen gas are needed to react with CS_2 to produce 2.50 L of CH_4 at STP?
 $4H_2(g) + CS_2(g) \rightarrow CH_4(g) + 2H_2S(g)$
 a. 2.50 L
 b. 5.00 L
 c. 7.50 L
 d. 10.0 L
50. length?
 a. 12.98 cm
 b. 13.0 cm
 c. 13.00 cm
 d. 12.9 cm
27. Express the sum of 7.68 m and 5.0 m using the correct number of significant digits.
 a. 12.68 m
 b. 12.7 m
 c. 13 m
 d. 10 m
28. How many valence electrons are in a silicon atom?
 a. 2
 b. 4
 c. 6
 d. 8
29. Iron(III) oxide is formed when iron combines with oxygen in the air. How many grams of Fe_2O_3 are formed when 16.7 g of Fe reacts completely with oxygen? The molar mass of Fe_2O_3 is 159.70 g/mol
 $4Fe(s) + 3O_2(g) \rightarrow 2Fe_2O_3(s)$
 a. 12.0 g
 b. 23.9 g
 c. 47.8 g
 d. 95.6 g
30. Which conversion factor do you use first to calculate the number of grams of CO_2 produced by the reaction of 50.6 g of CH_4 with O_2 ? The equation for the complete combustion of methane is:
 $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(l)$
 a. 1 mol CH_4 / 16.0 g CH_4
 b. 2 mol O_2 / 1 mol CO_2
 c. 16.0 g CH_4 / 1 mol CO_2
 d. 44.0 g CO_2 / 2 mol CO_2
31. The closeness of a measurement to its true value is a measure of its _____.
 a. precision
 b. accuracy
 c. reproducibility
 d. usefulness
32. What is the molar mass of $(NH_4)_2CO_3$?
 a. 144 g
 b. 138 g
 c. 96 g
 d. 78 g
33. A substance that can be separated into two or more substances only by a chemical change is a(n) _____.
 a. solution
 b. element
 c. mixture
 d. compound
34. What is the density of an object having a mass of 8.0 g and a volume of 25 cm^3 ?
 a. 0.32 g/cm^3
 b. 2.0 g/cm^3
 c. 3.1 g/cm^3
 d. 200 g/cm^3
35. Which of the following is a physical property of water?
 a. It reacts with calcium metal to produce a basic solution.
 b. It can be decomposed by electrolysis.
 c. It is composed of hydrogen and oxygen.
 d. It melts below room temperature.
36. All atoms are
 a. positively charged, with the number of protons exceeding the number of electrons.
 b. negatively charged, with the number of electrons exceeding the number of protons.
 c. neutral, with the number of protons equaling the number of electrons.
 d. neutral, with the number of protons equaling the number of electrons, which is equal to the number of neutrons.
37. In Bohr's model of the atom, where are the electrons and protons located?
 a. The electrons move around the protons, which are at the center of the atom.
 b. The electrons and protons move throughout the atom.
 c. The electrons occupy fixed positions around the protons, which are at the center of the atom.
 d. The electrons and protons are located throughout the atom, but they are not free to move.
38. Which of the following elements is in the same period as phosphorus?
 a. carbon
 b. magnesium
 c. nitrogen
 d. oxygen
39. Which of the following categories includes the majority of the elements?
 a. metalloids
 b. liquids
 c. metals
 d. nonmetals



What is the