

## AP Chemistry

2020 Summer Assignment – **Due Monday, August 9, 2021 (8 am)**General Instructions

**Order your AP Chemistry textbook (Zumdahl, 10<sup>th</sup> edition).** You may use an e-book or a physical book. You will NOT be bringing the book to class, but you will want it for reference. Most of the homework (including the summer assignment) will be from this book. You should also have the Hayden-McNeil spiral bound notebook the first day of school. (This is your lab notebook.)

**Sign in to WebAssign using the class key: incarnate.tx 8264 4608;** The course name is AP Chemistry 2021- 2022.

1. You must pay for Webassign using a credit card (should be \$35), so that you can complete these problems on line. You will have multiple chances (typically 5) to get the correct answer. The majority of your Zumdahl homework will be submitted via WebAssign. Note that Webassign randomizes information in the questions so they may not appear exactly as they are in the book.
2. Chapters 1-3 are a review of 10<sup>th</sup> grade Chemistry topics. Read these chapters and do the assigned work for each of the chapters. Wait until early August to do this work; ideally starting around the 5<sup>th</sup> so it is fresh in your mind. This assignment will take 4-5 hours. DO NOT WAIT UNTIL THE NIGHT BEFORE SCHOOL STARTS.)
3. Review the ion and conversion factor sheets. You'll have to know all those ions and conversion factors. (If you took Honors Chemistry, you should already know these; if not, learn them.)
4. Test of Chapters 1-3 will be the first full week of school (August 21).

Homework (From Chemistry, Zumdahl & Zumdahl, 10<sup>th</sup> edition) – **Must be submitted via Webassign by 8/9/21**

Chapter 1: pp. 34-34f; #30, 34, 35, 38, 40, 43, 46, 56, 69, 71, 75, 83, 85, 119

Chapter 2: pp. 67-67d; # 33, 59, 61, 66, 68, 76, 77, 78, 79, 80, 81, 83, 84, 85, 87, 88, 91

Chapter 3: pp. 115-115; #39, 41, 43, 48, 67, 71, 73, 76, 78, 83, 85, 88, 89, 96

Test 1 Topics

## Chapter 1

1. Basic chemistry terminology
2. Conversions
3. Significant figures
4. Dimensional analysis
5. Density

## Chapter 2

1. Periodic Law
2. Charges on common polyatomic ions
3. Writing formulas and naming compounds

## Chapter 3

1. Mole
2. Isotopes, calculations and mass spectrometers
3. Mass %
4. Percent composition
5. Empirical and molecular formula determination
6. Basic stoichiometric calculations
7. Percent Yield

**Conversion Factors**

| METRIC CONVERSION FACTORS |        |   |
|---------------------------|--------|---|
| Name                      | Symbol | Quantity                                  |
| Giga                      | G      | $10^9$ (1 GB = 1,000,000,000 B) B = bytes |
| Mega                      | M      | $10^6$ (1 MB = 1,000,000 B)               |
| Kilo                      | k      | $10^3$ (1 kg = 1,000 g)                   |
| centi                     | c      | $10^{-2}$ (1 cm = 0.01 m)                 |
| milli                     | m      | $10^{-3}$ (1 mm = 0.001 m)                |
| micro                     | $\mu$  | $10^{-6}$ (1 $\mu$ g = 0.000001 g)        |
| nano                      | n      | $10^{-9}$ (1 nm = 0.000000001 m)          |
| pico                      | p      | $10^{-12}$ (1 pL = 0.000000000001 L)      |

| METRIC AND AMERICAN CONVERSIONS |   |                        |
|---------------------------------|---|------------------------|
| Mass                            |   |                        |
| 454 g                           | = | 1 lb                   |
| 16 oz.                          | = | 1 lb                   |
| 2000 lb                         | = | 1 ton                  |
| Volume                          |   |                        |
| 4 qts.                          | = | 1 gal                  |
| 1.06 qt.                        | = | 1 L                    |
| 32 oz.                          | = | 1 qt.                  |
| Length                          |   |                        |
| 2.54 cm                         | = | 1 in.                  |
| 12 in.                          | = | 1 ft                   |
| 36 in.                          | = | 1 yd                   |
| 5280 ft                         | = | 1 mi                   |
| Time                            |   |                        |
| 60 sec                          | = | 1 min                  |
| 60 min                          | = | 1 hr                   |
| Number of Particles             |   |                        |
| 1 mole                          | = | $6.022 \times 10^{23}$ |

**USEFUL VOLUME CONVERSIONS**

Water Density – 1.00 g/ml @ 25 °C (D = m/v)

1 mL = 1 cm<sup>3</sup>

**Acids to Name & Identify as Strong or Weak**

HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub> – acetic acid (weak)

HNO<sub>3</sub> – nitric acid (strong)

HNO<sub>2</sub> – nitrous acid (weak)

H<sub>2</sub>SO<sub>4</sub> – sulfuric acid (strong)

H<sub>2</sub>SO<sub>3</sub> – sulfurous acid (weak)

H<sub>2</sub>CO<sub>3</sub> – carbonic acid (weak)

H<sub>2</sub>C<sub>2</sub>O<sub>4</sub> – oxalic acid (weak)

H<sub>3</sub>PO<sub>4</sub> – phosphoric acid (weak)

H<sub>3</sub>PO<sub>3</sub> – phosphorous acid (weak)

HClO<sub>4</sub> – perchloric acid (strong)

HClO<sub>3</sub> – chloric acid (strong)

HClO<sub>2</sub> – chlorous acid (weak)

HClO – hypochlorous acid (weak)

HF – hydrofluoric acid (weak)

HCl – hydrochloric acid (strong)

HBr – hydrobromic acid (strong)

HI – hydroiodic acid (strong)

**Polyatomic Ions to Learn**

| Ion Charge | Polyatomic Ion Symbol   | Polyatomic Ion Name                   |
|------------|---|---------------------------------------|
| 2+         | $\text{Hg}_2^{2+}$  | mercury (I)                           |
| 1+         | $\text{NH}_4^{1+}$  | ammonium                              |
| 1-         | $\text{C}_2\text{H}_3\text{O}_2^{1-}$ or $\text{CH}_3\text{COO}^{1-}$ | acetate                               |
|            | $\text{OH}^{1-}$  | hydroxide                             |
|            | $\text{BrO}^{1-}$ $\text{ClO}^{1-}$ $\text{IO}^{1-}$                  | hypobromite, hypochlorite, hypoiodite |
|            | $\text{BrO}_2^{1-}$ $\text{ClO}_2^{1-}$ $\text{IO}_2^{1-}$            | bromite, chlorite, iodite             |
|            | $\text{BrO}_3^{1-}$ $\text{ClO}_3^{1-}$ $\text{IO}_3^{1-}$            | bromate, chlorate, iodate             |
|            | $\text{BrO}_4^{1-}$ $\text{ClO}_4^{1-}$ $\text{IO}_4^{1-}$            | perbromate, perchlorate, periodate    |
|            | $\text{CN}^{1-}$  | cyanide                               |
|            | $\text{HCO}_3^{1-}$   | hydrogen carbonate (bicarbonate)      |
|            | $\text{HSO}_4^{1-}$   | hydrogen sulfate (bisulfate)          |
|            | $\text{HSO}_3^{1-}$   | hydrogen sulfite (bisulfite)          |
|            | $\text{HS}^{1-}$  | hydrogen sulfide (bisulfide)          |
|            | $\text{H}_2\text{PO}_4^{1-}$  | dihydrogen phosphate                  |
|            | $\text{MnO}_4^{1-}$   | permanganate                          |
|            | $\text{NO}_2^{1-}$ $\text{NO}_3^{1-}$                                 | nitrite, nitrate                      |
|            | $\text{SCN}^{1-}$   | thiocyanate                           |
| 2-         | $\text{O}_2^{2-}$   | peroxide                              |
|            | $\text{CO}_3^{2-}$  | carbonate                             |
|            | $\text{C}_2\text{O}_4^{2-}$   | oxalate                               |
|            | $\text{CrO}_4^{2-}$   | chromate                              |
|            | $\text{Cr}_2\text{O}_7^{2-}$  | dichromate                            |
|            | $\text{SO}_3^{2-}$ $\text{SO}_4^{2-}$                                 | sulfite, sulfate                      |
|            | $\text{HPO}_4^{2-}$   | hydrogen phosphate                    |
|            | $\text{S}_2\text{O}_3^{2-}$   | thiosulfate                           |
|            | $\text{SiO}_3^{2-}$   | silicate                              |
| 3-         | $\text{PO}_3^{3-}$ $\text{PO}_4^{3-}$                                 | phosphite, phosphate                  |

**Other Concepts to Learn/Be Aware of**

| Topic            | Definition                                   | Variable    |
|------------------|--|-------------|
| Potential Energy | Stored energy                                | $PE$ or $U$ |
| Kinetic Energy   | Energy associated with motion                | $KE$        |
| Velocity         | Change in an object's position over time     | $\vec{v}$   |
| Acceleration     | Change in an object's velocity over time     | $\vec{a}$   |
| Force            | Product of an object's mass and acceleration | $\vec{F}$   |