

## Chem I Unit 1 Review

Use these problems as a guide to help you prepare for the Unit 1 exam. Be sure that you can show all work and calculations used in arriving at your answer. If you are having trouble with a particular type of problem or question, use the assignments from this past unit to practice more of that type of problem.

Cadmium has the following isotopes: Use this information to answer the following questions:

<i>Isotope</i>	<i>Atomic Mass</i>	<i>Abundance</i>	<i>Isotope</i>	<i>Atomic Mass</i>	<i>Abundance</i>
cadmium - 106	105.906 amu	1.20%	cadmium - 112	111.903 amu	24.0%
cadmium - 108	107.904 amu	0.9%	cadmium - 113	112.904 amu	12.3%
cadmium - 110	109.903 amu	12.4%	cadmium - 114	113.903 amu	28.8%
cadmium - 111	110.904 amu	12.8%	cadmium - 116	115.905 amu	7.6%

1. Create a table which shows the atomic number, mass number and number of protons, neutrons and electrons for each of the isotopes of cadmium. Use appropriate notation to identify each isotope of cadmium.

2. Use the abundances of the isotopes to calculate the atomic mass of cadmium. Show all of your calculations and use the correct number of significant figures in your answer.

3. Complete the table below:

<i>Symbol</i>	<i>Atomic Number</i>	<i>Mass Number</i>	<i>Protons</i>	<i>Neutrons</i>	<i>Electrons</i>
	76	190			
			21	24	
		86			37
	74			110	
		127		75	
		14			6

4. Match the theories about atomic structure with the following scientists:

**Dalton    Thomson    Rutherford**

a. Most of the volume of an atom is empty space, with almost all of the mass concentrated in a central core called the nucleus.

b. An atom is made of a ball of positive charge with negatively charged particles which are distributed evenly throughout the atom "like raisins in a plumb pudding".

c. Elements are composed of indivisible particles called "atoms".

5. Use the following data to calculate the density of a liquid. Use the appropriate units and significant figures in your answer. Then determine whether this liquid will float on the top of a glass of water at room temperature or sink to the bottom. Explain your answer.

mass of empty graduated cylinder	54.32 g
mass of graduated cylinder with liquid	87.09 g
volume of liquid	31.98 mL

**Explain what you should do in the following laboratory situations:**

6. Your lab partner has just splashed concentrated hydrochloric acid in her face.
7. You have burned your elbow by getting it too close to a bunsen burner flame.
8. You notice that a hot plate is sitting in a puddle of water on the laboratory bench.
9. You splash concentrated acid on your hand.

## Answers to Unit 1 Review - Chemistry I

1.

<i>Isotope</i>	<i>Atomic Number</i>	<i>Mass Number</i>	<i>Protons</i>	<i>Neutrons</i>	<i>Electrons</i>
$^{106}_{48}\text{Cd}$	48	106	48	58	48
$^{108}_{48}\text{Cd}$	48	108	48	60	48
$^{110}_{48}\text{Cd}$	48	110	48	62	48
$^{111}_{48}\text{Cd}$	48	111	48	63	48
$^{112}_{48}\text{Cd}$	48	112	48	64	48
$^{113}_{48}\text{Cd}$	48	113	48	65	48
$^{114}_{48}\text{Cd}$	48	114	48	66	48
$^{116}_{48}\text{Cd}$	48	116	48	68	48

2. Atomic Mass = 112.4 amu

3.

<i>Symbol</i>	<i>Atomic Number</i>	<i>Mass Number</i>	<i>Protons</i>	<i>Neutrons</i>	<i>Electrons</i>
Os	76	190	76	114	76
Sc	21	45	21	24	21
Rb	37	86	37	49	37
W	74	184	74	110	74
Te	52	127	52	75	52
C	6	14	6	8	6

4. a. Rutherford b. Thomson c. Dalton

5. Density = 1.025 g/mL. The density of the liquid is slightly higher than the density of water at room temperature (.998 g/mL at 20° C.) I would expect that this liquid would eventually end up at the bottom of the glass, because we have learned from the density demonstration that objects which are less dense will float on top of fluids which are more dense. Water, being less dense will float on top, but given the similar values of density, the unknown liquid will sink very slowly.

6. You should help your partner to the eyewash and she should hold her face in the eyewash for at least 1 minute. After one minute or more, remove her goggles and rinse her face for another minute. During this time, you should get someone else to notify the teacher.

7. Hold the burned area under cold water.

8. If the hot plate is not plugged in, do not plug it in until it and the benchtop are completely dry. If it is plugged in, notify the teacher. Do not touch it if it is plugged in.

9. Rinse the affected area under cold water. Keep rinsing it and have someone notify the teacher.