Chemistry Unit Test - SNC 1D

1. For each of the following, identify as an:
   - element
   - compound
   - solution
   - colloid
   - suspension
   - mechanical mixture

a box of smarties	Mechanical Mixture ✓
vinegar	Solution ✓
lead	Element ✓
air	Solution
muddy water	Suspension ✓
mayonnaise	colloid ✓
argon	Element ✓
calcium carbonate	Compound ✓
copper(II) sulphate pentahyrate ($CuSO_4 \cdot 5H_2O$)	compound ✓
steel, composed of iron, carbon, nickel and vanadium	Solution

10A

2. On the next page, there are 34 word statements and on the following page there are 34 words, each of which corresponds to one of the statements. Please note the letter code that goes with each word. Please place the MOST CORRECT **CAPITAL** LETTER in the space provide before each statement. Please use pencil. Some statements may apply to more than one word, however, there is always a better choice. If you fold your test carefully you will be able to see the statements and the letter code at the same time!!

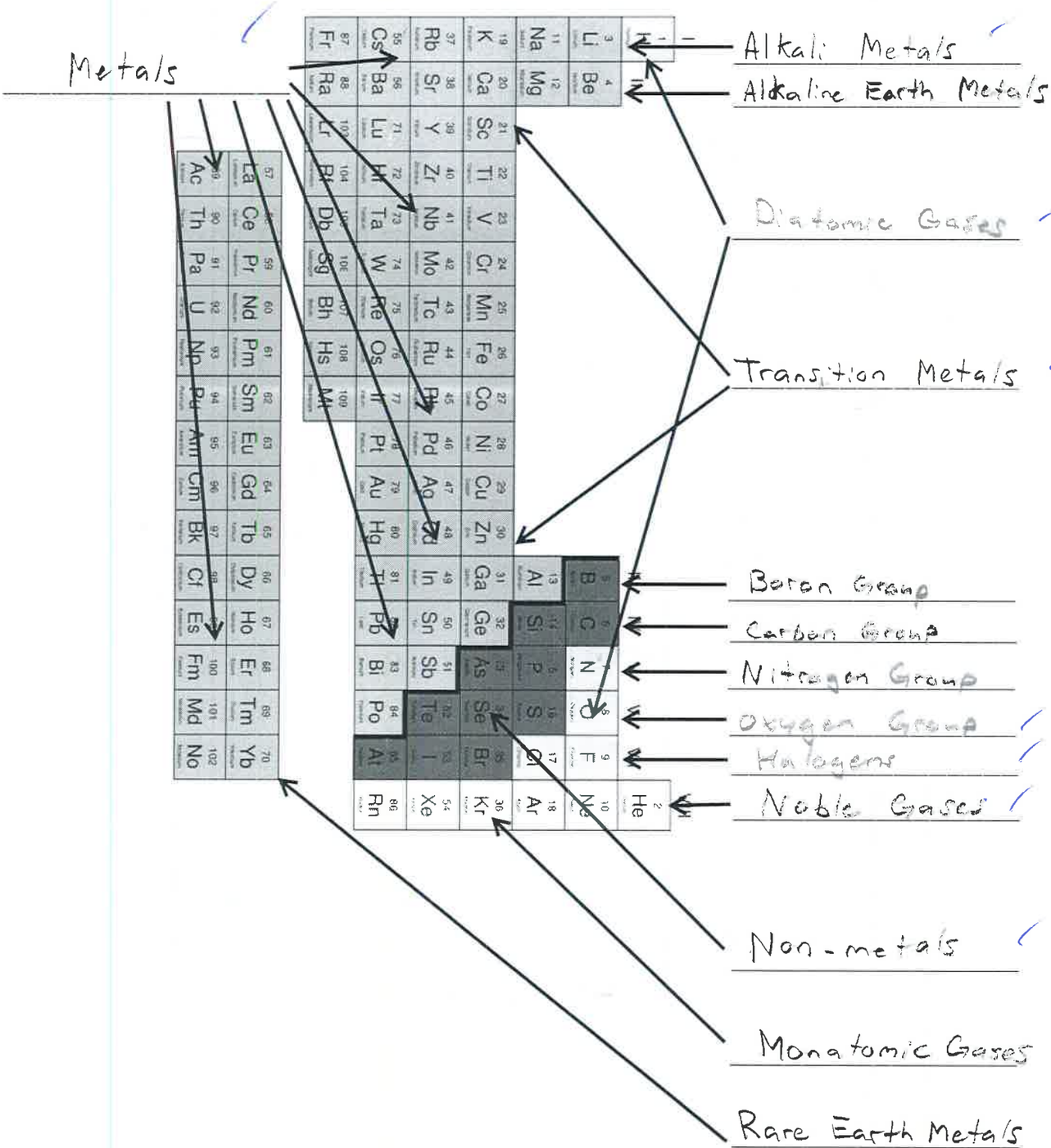
10 /10A

E	may be homogeneous or heterogeneous and always contain more than one type of particle
Q	are negatively charged and orbit the nucleus
D	are composted of two or more elements that are chemically bonded in a precise ratio of atoms as described by a chemical formula
B	has distinctly different regions in its overall composition
H	are alway homogeneous and are able to allow light to pass through without causing a Tyndall effect (causes light to scatter, like a flashlight through fog)
F	are homogeneous and do not separate and are often opaque (opaque: do not allow light to pass through)
BB	were the only elements for which we were able to complete Bohr diagrams
EE	occurs when atoms share valence shell electrons
Z	are gas particles that are made from elemental molecules that use a covalent bond in order to create full valance shells through sharing
HH	is classified as a non-metal
N	any observation that uses numbers and can frequently be used to identify a substance
S	is the number of protons located in the nucleus and also determines an atoms location on the periodic table
W	form monatomic gases and are located in the column on the far right of the periodic table
V	are located in the second last column of the periodic table
X	are made from the columns ranging from scandium to zinc and are located in the middle of the periodic table
CC	the outermost electron shell in any atom
DD	occurs when there is a loser atom and a gainer atom
P	are neutral and located in the nucleus and make up more than half of an atoms total mass
R	is the sum of the protons plus neutrons that are located in the nucleus of an atom
K	can be measured without destroying the substance being tested
AA	are the most common type of element found on the periodic table
I	do not create new chemical compounds
J	always create new compounds that will have a new chemical formula
C	have only one type of atom only
G	are able to separate into two phases if left to stand
GG	have a negative charge
M	any observation that is made without the use of numbers
Y	have been removed from the main part of the periodic table and have been placed below in order to make the periodic table fit on a regular piece of paper
T	are located in the first column of the periodic table
U	are located in the second column of the periodic table
L	cannot be measured without destroying the substance being tested
A	is something that is the same throughout
O	are positively charged and located in the nucleus
FF	have a positive charge

34 /34K

A homogeneous
B heterogeneous
C elements
D compounds
E mixtures
F colloids
G suspensions
H solutions
I physical changes
J chemical changes
K physical properties
L chemical properties
M qualitative
N quantitative
O protons
P neutrons
Q electrons
R mass number
S atomic number
T alkali metals
U alkaline earth metals
V halogens
W noble gases
X transition metals
Y rare earth metals
Z diatomic gases
AA metals
BB main group elements
CC valence shell
DD ionic bonding
EE covalent bonding
FF cations
GG anions
HH hydrogen

3. Add labels to this periodic table as was done on the exercise during class. Please use the list of words on the previous page as an aid to help with this process.



11 /11K

m=DV

4. Please use proper format for both density calculations as used in class and on the quiz. Please convert units such that units are in agreement during each calculation.

mega M	kilo k	hepto h	deca da	**base unit**	deci d	centi c	milli m	micro μ
← ÷1000 → x1000	← ÷10 → x10	← ÷10 → x10	← ÷10 → x10	← ÷10 → x10	← ÷10 → x10	← ÷10 → x10	← ÷1000 → x1000	

a) Determine the mass in kg of 1.245 L of liquid mercury given that the density of liquid mercury is 13.55 mg/mL

m = ? - kg
D = 13.55 mg/mL
V = 1.245 L → 1245 mL

m = DV
m = 13.55 mg/ml × 1245 mL
m = 16869.75 mg
m = 0.01686975 kg

7/7A

b) 25.00 kg of a metal has a volume of 2.2046 L. Use this information and the table at the bottom of this page to identify the metal in this question.

m = 25 kg → 25000 g
D = ?
V = 2.2046 L → 2204.6 mL

$D = \frac{m}{V}$
$D = \frac{25000\ g}{2204.6\ mL}$
D = 11.33992561 g/mL
D = 11.34 g/mL

∴ Lead is the metal

7/7A

Densities of some common metals

Metal	Density (g/cm³)
Aluminum	2.70
Copper	8.94
Gold	19.3
Iron	7.86
Lead	11.34
Magnesium	1.74
Silver	10.5
Tin	5.75
Zinc	7.14

14/14A

5. What does the "atomic number" of the element tell you? What is the atomic number of the element potassium?

Atomic # is how many protons and position on the periodic table. Potasium has an atomic # of 19

2/2T

6. What does the mass number of the element tell you. What do you need to know to calculate a mass number?

Mass number is how heavy an atom is. To find you add the protons + the neutrons.

2/2T

7. Please complete the missing information in the following:

Iridium	192 Ir 77	# of p⁺ = 77 # of n = 115 ✓ # of e⁻ = 77
Molybdenum	96 Mo 42	# of p⁺ = 42 # of n = 54 ✓ # of e⁻ = 42
Cadmium	112 ✓ Cd 48	# of p⁺ = 48 # of n = 64 # of e⁻ = 48
Praseodymium	141 ✓ Pr 59	# of p⁺ = 59 # of n = 82 # of e = 59

7/7T

8. What is the key difference between a physical vs a chemical change?

A chemical change creates a new substance and a physical does not.

1/1T

9. Please identify as a physical or chemical change. If it is a chemical change please add the evidence of chemical change

a) a candle flame Chemical
Created heat / light

b) melting candle wax Physical
change of state

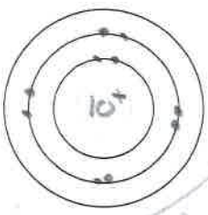
3/3T

15/15T

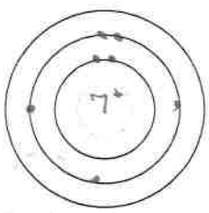
10. Complete each Bohr diagram by adding electrons in the correct locations. Which of the diagrams that you have completed have a full valence shell?

Neon and Helium

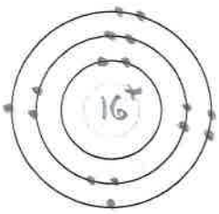
Ne



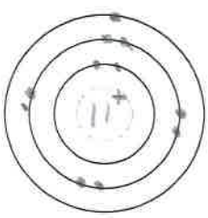
N



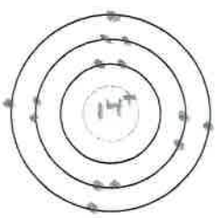
S



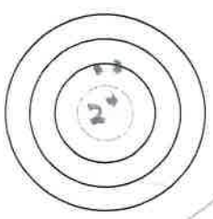
Na



Si



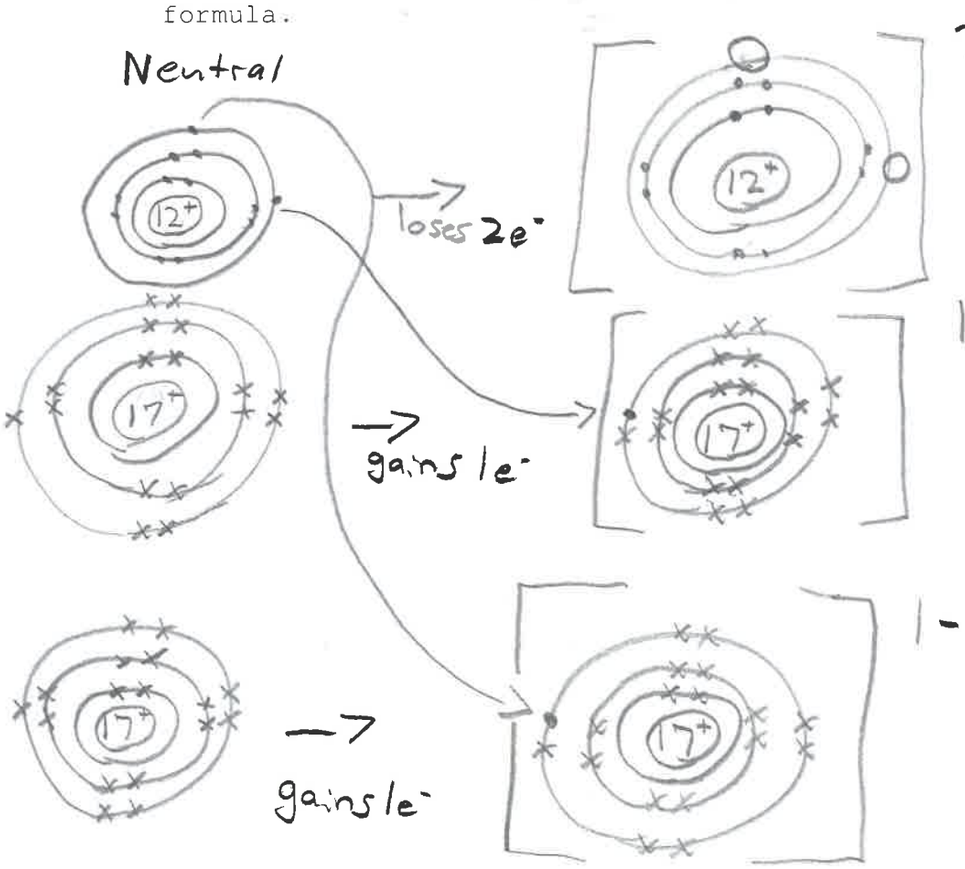
He



14/14T

11. Show how ionic bonding works between Mg and Cl. To do this, draw Bohr diagrams of the neutral atoms and then redraw the atoms after they have lost or gained electrons and show using an arrow where the electrons have travelled. Please use dots for the magnesium electrons and small "x"s for the chlorine electrons. Hint, to do this correctly, you will need to draw a total of 6 Bohr diagrams. Write the chemical formula.

Neutral



10/10T

24/24T

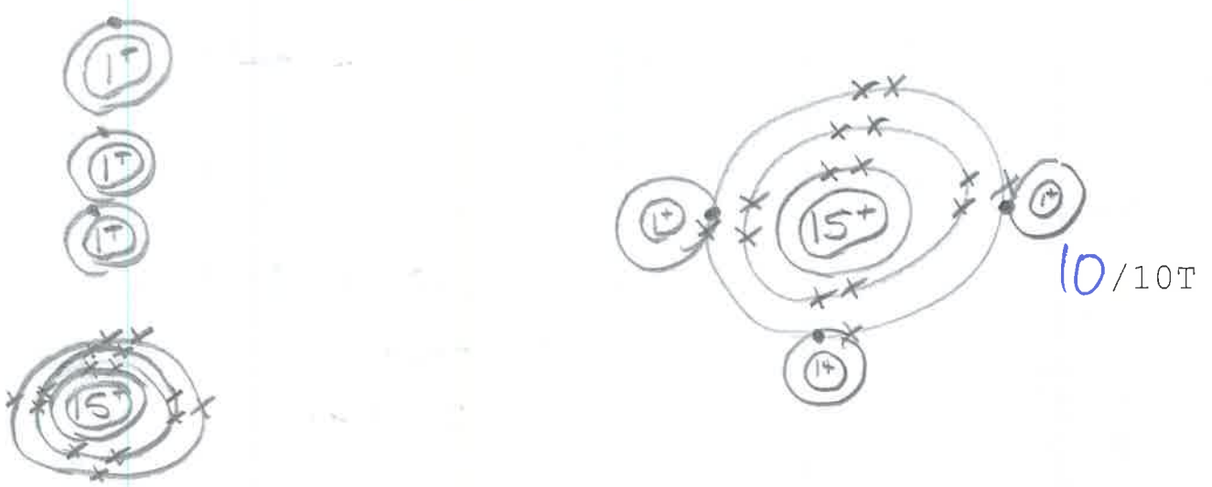
∴ Cl_2Mg is the formula

12. Show how covalent bonding works between hydrogen and oxygen to form water. Please draw hydrogen and oxygen before bonding and then a second time to show how the bonding works. Please use dots for the hydrogen electrons and small "x"s for the oxygen electrons. Write the chemical formula.

10/10T

∴ H_2O is the formula

13. Please use instructions from either question #11 or #12 to show the bonding between P and H Phosphorus Hydrogen



10/10T

∴ PH_3 is the formula

14. Please write the type and number of atoms found in each formula. 10/10T

$C_{12}H_{22}O_{11}$	$Fe(NO_3)_3$	$Co(NH_3)_6Cl_3$
Carbon - 12 Hydrogen - 22 Oxygen - 11	Iron - 1 Nitrogen - 3 Oxygen - 9	Cobalt - 1 Nitrogen - 6 Hydrogen - 18 Chlorine - 3

30/30T