Name: Key
Blk:_____ Date:_____

CHEMISTRY 11
UNIT IV TEST REVIEW

YOUR UNIT IV TEST IS SCHEDULED FOR _____. The format of the test will be 40 marks multiple choice and 20 marks short answer. In order to help you prepare for your test you must complete the following package and hand it in at start of class on the day of the test.

There are FIVE Parts to this unit:
1. Identifying types of Bonds: covalent, polar covalent and ionic
2. Drawing Lewis Dot Structures
3. IdentifyingTypes of Chemical Reactions
4. Predicting Products
5.Exothermic and Endothermic reactions

Part I. BOND TYPES

1. What is a chemical bond?

The force that holds atoms together in compounds.

2. Explain the difference between COVALENT, POLAR COVALENT and IONIC bonds.

0.0-0.5 Covalent = 100% sharing of electrons
0.5-1.7 Polar = an unequal sharing of electrons
1.7-3.3 Ionic = one atom very strongly attracts the electrons

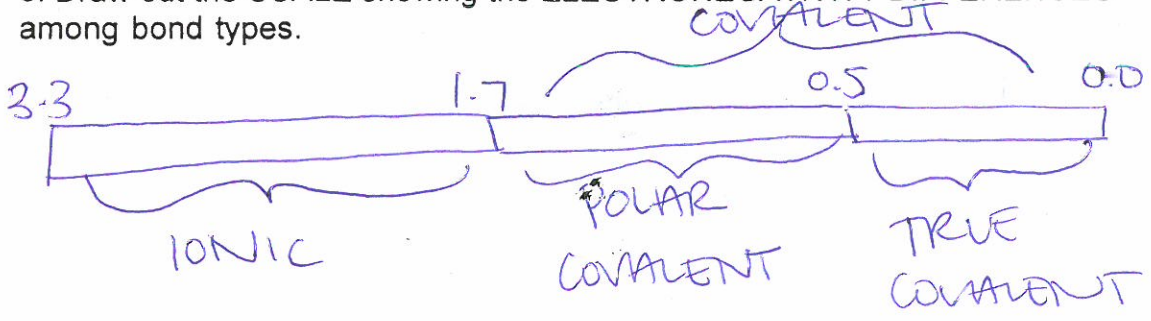
3. What is ELECTRONEGATIVITY?

The tendency of an atom to attract electrons from a neighbouring atom

4. Use the table of ELECTRONEGATIVITIES on pg 333 and state the periodic trend.

Electronegativity INCREASES as you go left to right across a period and as you go UP a family.

5. Draw out the SCALE showing the ELECTRONEGATIVITY DIFFERENCES among bond types.



6. Using the ELECTRONEGATIVITIES TABLE on pg 333 identify what type of bond is holding together the atoms in the following compounds (show your calculations)

a. $CaCl_2$ → Cl (2.8) − Ca (1.0) = 1.8 ∴ IONIC

b. I_2 → I (2.2) − I (2.2) = 0.0 ∴ TRUE COVALENT

c. CO_2 → O (3.5) − C (2.5) = 1.0 ∴ POLAR COVALENT

d. Rb_2S → S (2.4) − Rb (0.8) = 1.6 ∴ POLAR COVALENT

e. Zn_3P_2 → P (2.1) − Zn (1.7) = 0.4 ∴ TRUE COVALENT

Part II LEWIS DOT STRUCTURES

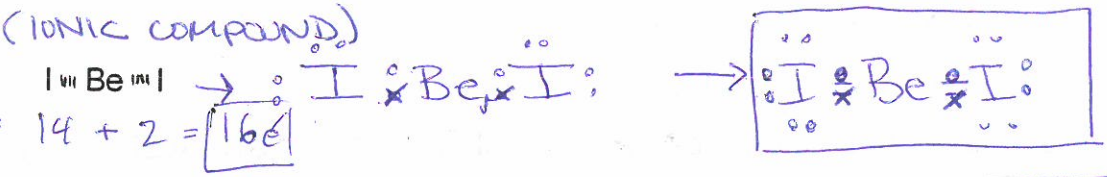
1.For the following compounds:

a. Be sure to calculate the total number of valence electrons

b. Draw the Lewis Dot Structures

(IONIC COMPOUND)

1. I — Be — I → 2 I = 14 + 2 = 16e



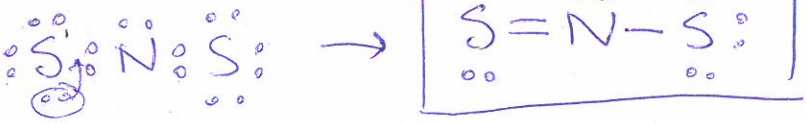
2. [S — N — S]$^{1-}$

2 S = 12

1 N = 5

+ 1

18e

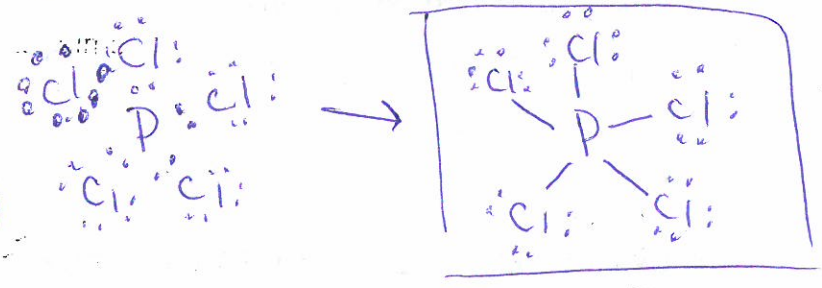


3. Cl, Cl, Cl, Cl, P

5 Cl = 35

1 P = 5

40e



4. [O — N]$^{+1}$

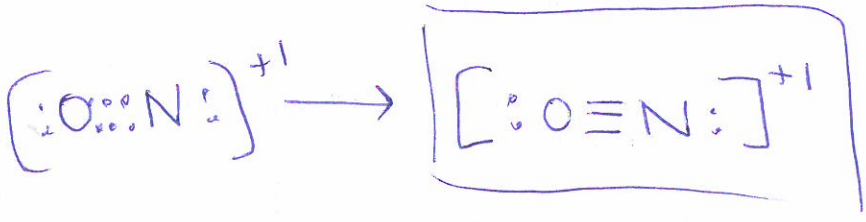
1 O = 6

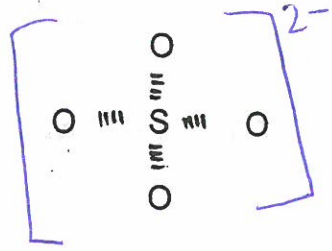
1 N = 5

11e

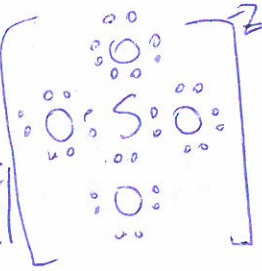
− 1

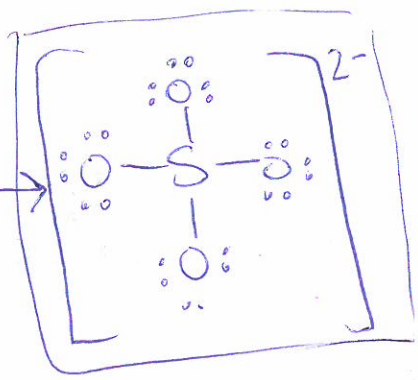
10e



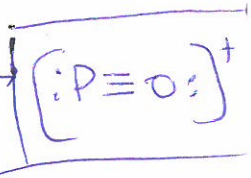
5. 

$40 = 24$
$1S = 6$
$2e = 2$
$32e$





6. $[P \equiv O]^{1+}$ $1P = 5$, $1O = 6$, $11 - 1 = 10e$



Part III Types of Chemical Reactions

1. List the SIX TYPES of chemical reactions and give an example for each

1. Synthesis: $2H_2(g) + O_2(g) \longrightarrow 2H_2O(g)$
2. Decomposition: $2HCl(g) \longrightarrow H_2(g) + Cl_2(g)$
3. Single Replacement: $Zn(s) + CuCl_2(aq) \longrightarrow ZnCl_2(aq) + Cu(s)$
4. Double Replacement: $AgNO_3(aq) + NaCl(aq) \rightarrow AgCl(s) + NaNO_3(aq)$
5. Neutralization: $HCl(aq) + NaOH(aq) \rightarrow NaCl(aq) + H_2O(l)$
6. Combustion: $CH_4(g) + 2O_2(g) \longrightarrow CO_2(g) + 2H_2O(l)$

Part IV Predicting Products

1. Predict the products of the following reactions and then balance it:

a) $2HNO_3 + Sr(OH)_2 \longrightarrow Sr(NO_3)_2(aq) + 2H_2O(l)$

b) $2NO_2 \text{ ----> } N_2(g) + 2O_2(g)$

c) $2AlCl_3 + 3Na_2CO_3 \text{ ---> } Al_2(CO_3)_3 + 6NaCl(aq)$

d) $4Li + O_2 \text{ ----> } 2Li_2O$

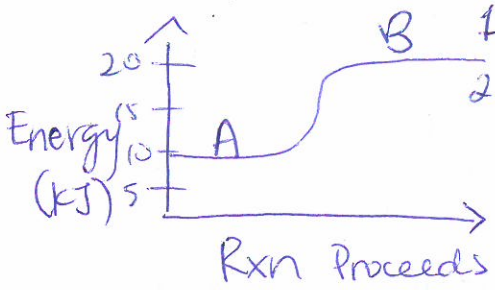
e. $Cl_2 + CaBr_2 \text{ --> } CaCl_2 + Br_2(g)$

f. $C_2H_8 + 4O_2 \text{ ---> } 2CO_2(g) + 4H_2O(l)$

Part V Endothermic and Exothermic Reaction

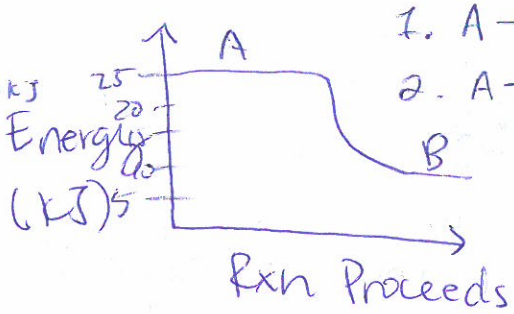
1. Draw a Energy Diagram for

a. an ENDOTHERMIC Reaction



1. $A + 10\,kJ \rightarrow B$
2. $A \rightarrow B;\ \Delta H = +10\,kJ$

b. an EXOTHERMIC Reaction



1. $A \rightarrow B + 15\,kJ$
2. $A \rightarrow B;\ \Delta H = -15\,kJ$

2. What is the formula for calculating ΔH?

$\Delta H = H_{PRODUCTS} - H_{REACTANTS}$

3. In an endothermic reaction, do you have to add or remove energy in order for the products to form?

You must ADD energy to form the products in an endothermic rxn!

4. For the following equations what would the ΔH value be?

a. $2\ KClO_3\ (s) + 41.4kJ \text{ ---> } 2\ K(s) + 3\ ClO_2\ (g)$

$\Delta H = +41.4\,kJ$

b. $CH_4\ (g) + 2\ O_2\ (g) \text{ ---> } CO_2\ (g) + 2\ H_2O\ (g) + 891\ kJ$

$\Delta H = -891\,kJ$.