

ACDB4011 CHEMISTRY QUIZ 2

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DATE: November 02, 2022

1. (6 points) Indicate whether each of the following statements is true or false:

T F
☒ ~~F~~

A C-C single bond is generally shorter than a C=C double bond.

C=C short strong

☒ ~~F~~

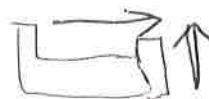
One mole of magnesium has the same number of atoms as one mole of hydrogen gas.(H₂) ✓ mg

☒ ~~I~~ ☐ Covalent bond forms when the atom shares an electron with another atom.

ionic does not covalent share

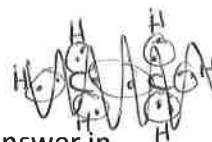
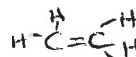
☒ ~~F~~ Among elements in a Main Group those with the largest radii have the smallest electronegativity.

☒ ~~F~~ Angstrom, Å, is the unit of the length of a chemical bond.



→ smaller

☒ ~~I~~ ☐ The C₂H₄ molecule has six bonding electron pairs and no lone pairs.

2. (8 points) How many nitrogen atoms are there in 30.0 g of N₂O₄. Give your answer in individual atoms, not moles.

$$\frac{30}{2(14.0067) + 4(15.9994)} = \text{mol} \quad \text{mol} = 0.326 \text{ mol}$$

$$\frac{30}{92.011} = \text{mol}$$

$$0.326 \times 6.02 \times 10^{23} = 1.963 \times 10^{23} \text{ molecules}$$

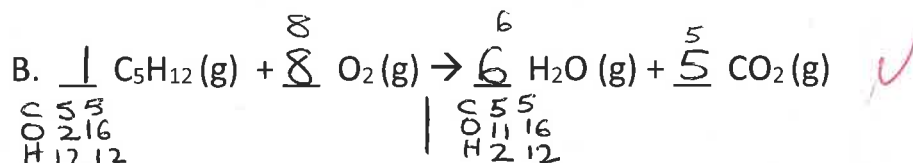
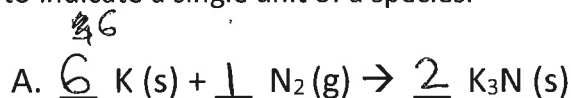
$$\times 6$$

$$= 1.18 \times 10^{24} \text{ atoms}$$

ZOE Communs P2

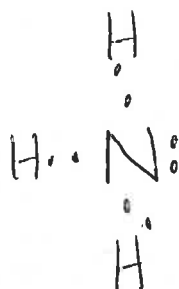
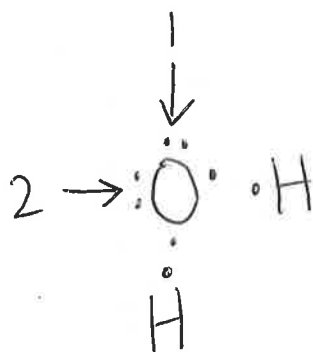
3. (6 points) Balance the following equations. Do not leave spaces blank. If needed, write "1" to indicate a single unit of a species.

6p



7p

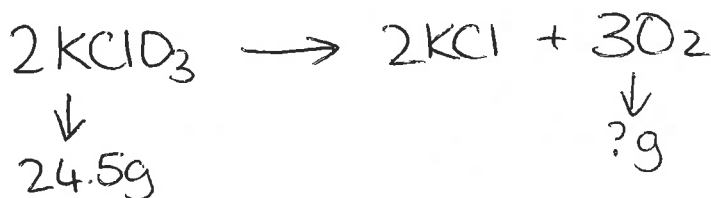
4. (7 points) Using the Lewis structures to support your answer, determine which molecule contains only TWO unshared pairs of electrons, H_2O or NH_3 .



H_2O 2 unshared pair of e^- .

8p

5. (8 points) Potassium chlorate decomposes when heated to potassium chloride and oxygen, according to the following chemical equation: $2 \text{KClO}_3(\text{s}) \rightarrow 2 \text{KCl}(\text{s}) + 3 \text{O}_2(\text{g})$. How many grams of oxygen gas can be obtained from 24.5 g of potassium chlorate?



$\frac{\text{mass}}{\text{mol}} = \text{mm}$

$\frac{24.5}{39.102 + 35.453 + 3(15.9994)} = \text{mol}$
 $\frac{24.5}{122.553} = \text{mol}$

$\frac{24.5}{122.553} = \text{mol}$
 $\text{mol} = 0.200$

$\text{mol} = 0.200$

$\frac{2:3}{0.200} \times 3 = 0.300$
 $\frac{0.200}{2} \times 3 = 0.300$

$\text{mass} = 0.300 \times (2 \times 15.9994)$

$\text{mass} = 9.60\text{g}$