

ACDB4011 CHEMISTRY QUIZ 2

17

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Lhp

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

- ✓

T	F
<u> </u>	<u> </u> ✓

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

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 One mole of magnesium has the same number of atoms as one mole of hydrogen gas.
- ✓

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 Covalent bond forms when the atom shares an electron with another atom.
- ~~✓~~

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 Among elements in a Main Group those with the largest radii have the smallest electronegativity.
- ✓

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 Angstrom, Å, is the unit of the length of a chemical bond.
- ✓

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 The C₂H₄ molecule has six bonding electron pairs and no lone pairs.

Op

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

$$N = 14.0067$$

$$O = 15.9994$$

$$n \text{ atoms} = n \times 6.02 \times 10^{23}$$

$$n = \frac{m}{M}$$

$$n \text{ nitrogen} = \frac{30}{(14.0067 \times 2)}$$

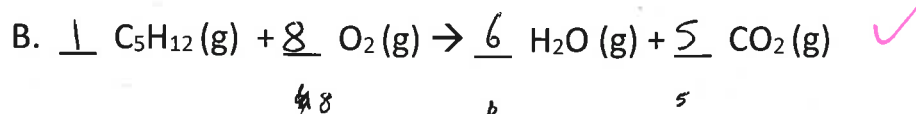
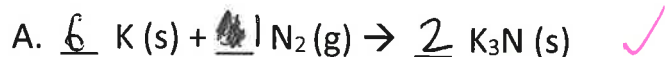
$$= 1.071 \text{ moles}$$

$$\text{Nitrogen atoms} = 1.071 \times 6.02 \times 10^{23}$$

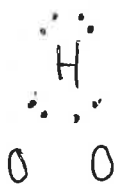
$$= 6.447 \times 10^{23} \text{ atoms}$$

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



- 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 contains 2 unshared electrons.

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

$$PV = nRt \quad n = \frac{m}{M}$$

$$n = \frac{24.5}{M}$$