

Chemistry 351

Quiz #1

September 5, 2018

Name: _____

Student Number: _____

Section Number: _____

TA: _____

INSTRUCTIONS:

This quiz consists of 6 questions on 3 pages. Please make certain that your quiz is complete.

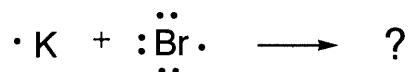
Write your name, student number, and section number on **both the quiz and answer sheet**. **Be certain to bubble in your PID digits on the answer sheet.** **The absence of any of these identification items will result in the deduction of 2 points from your score.**

Questions 1- 4 are each worth 1 point. Question 5 is worth 3 points. Question 6 is worth 3 points.

Write your answers to Questions 1-4 on the enclosed answer sheet. **Write your answer to Questions 5 and Question 6 in the space provided on this quiz.**

When you complete the quiz, insert your answer sheet into your quiz and then hand both in on the bench in front of the lecture hall in the spot indicated by your section number.

1. For the reaction of potassium and bromine:

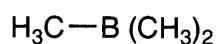


Which of the following statements are true:

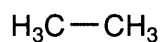
1. The product of the reaction is KBr where K and Br are linked by a covalent bond.
2. The product of the reaction is KBr where K and Br are linked by an ionic bond.
3. Elemental K will accept an electron from elemental Br during the indicated reaction.
4. Elemental Br will accept an electron from elemental K during the indicated reaction.
5. No reaction will occur.

a. 2,3 b. 1 c. 1,3 d. 1,4 e. 1,2,3,4 f. 2,4 g. 5

2. Of the covalent bond indicated in each of the following molecules, which is the most polar covalent bond?



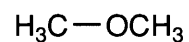
a.



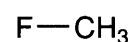
b.



c.

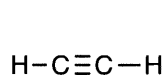


d.



e.

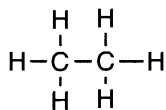
Questions 3 and 4 refer to structures 1-4.



1

230 kcal/mol

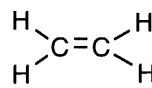
1.20 Å



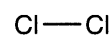
2

90 kcal/mol

1.54 Å



3



4

59 kcal/mol

1.98 Å

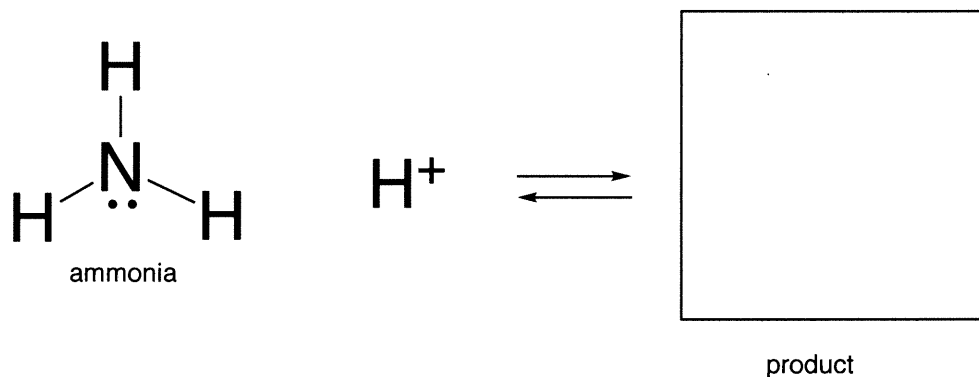
3. Given the indicated bond strengths for the C to C bond in ethyne **1**, the C to C bond in ethane **2**, and the Cl to Cl bond in chlorine **4**, predict the bond strength for the C to C bond in ethene **3** from the following choices:

a. 59 kcal/mol b. 230 kcal/mol c. 163 kcal/mol d. 90 kcal/mol e. 75 kcal/mol

4. Given the indicated bond lengths for the C to C bond in ethyne **1**, the C to C bond in ethane **2**, and the Cl to Cl bond in chlorine **4**, predict the bond length for the C to C bond in ethene **3** from the following choices:

a. 1.20 Å b. 1.98 Å c. 1.54 Å d. 1.33 Å e. 1.75 Å

5. (1 pt) a. In the labeled box provided below, draw the product formed from the reaction of ammonia with a proton.
 (1 pt) b. Provide the formal charge on the N atom in the product.
 (1 pt) c. Draw one arrow that depicts the flow of electrons during the reaction of ammonia with a proton.



6. (1 pt) a. In the labeled box provided below, draw Resonance Hybrid #2 of nitromethane that is the resonance hybrid of Structure #1 of nitromethane. **ALL formal charges and ALL lone electron pairs must be included** in your Structure #2.

(1 pt) b. **Draw two arrows** in Resonance Hybrid #1 of nitromethane that show the movement of electrons leading to the Resonance Hybrid #2 that you drew.

(1 pt) c. In the labeled box provided below, draw the **correct arrow or arrows between** Resonance Hybrid #1 and Resonance Hybrid #2 that depicts the correct relationship between these two structures.

