CH1010 Practice Exam 2 Fall 2000

In solving problems, you must show all work. Little or no credit will be given for a correct answer with no work shown.

1. We have talked about 4 types of secondary intermolecular forces: Hydrogen bonding, dipole-dipole forces, and London forces. Indicate which of the three forces you expect to be most important in the molecules below.

a. CH_4

b. CH_3-CH_2-OH

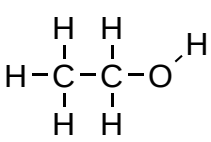
c. CH_3-CH_2-Cl

d. NH_3

2. a) A sample of gas has a volume of 1.25 L at 25^{o}C and 450 torr. What will it's volume be at STP?

b) The same gas weighs 4.3 g at STP. What is its molecular weight?

3. Which of the two isomers below would you expect to have the higher boiling point? Briefly explain your answer



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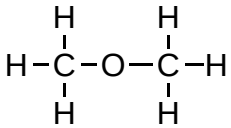

4. a) How many grams of KBr and of water would be needed to prepare 200g of a 9.2% w/w solution in water?

b) What is the molarity of the above solution? (1 g H_2O = 1 mL H_2O)

5. EPA regulations say that 2.5 ppm of a certain pesticide in the water supply is the allowable limit. You have collected 250 mL of a water sample and determined that it contains 3.7×10^{-4} g of the pesticide. Do a calculation to determine if this is within the allowable limit.

6. What volume of 0.180 M HCl can be prepared from 750 mL of 1.3 M HCl?

7. For the reaction below

$$CH_4 + H_2O \rightleftharpoons CO + 3H_2 + \text{heat}$$

a) Write the expression for the equilibrium constant

b) If there are 0.032 mol of CH_4 and H_2O, 0.4 mol of CO, and 1.2 mol of H_2 at equilibrium, calculate the equilibrium constant.

c) If more methane is added to the mixture, what happens to the position of equilibrium?

d) If the reaction is heated, what happens to the position of equilibrium?

e) Is the reaction exothermic or endothermic?

8. If 28 g C_2H_6 is burned in air, what volume will the CO_2 produced occupy at STP?