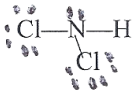
Gen Chem II (CHM 202) Fall 18 Dr. Hahn MWF 10 am Quiz VI 11/12 M Exam # _____

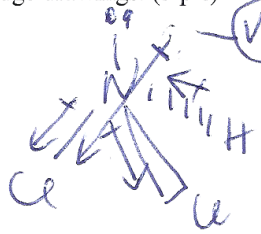
Name Key _____ Name _____

Sign Print (bc can't read signature)

Please **show work on all questions** for **full credit & partial credit**. (20 total pts).

1. a. Given the following Lewis Dot Structure and the VSEPRT chart, draw the 3 D structure using the wedge dash wedge drawings. (3 pts)





b. Does the molecule have vector sum which is [(zero dipole moment) or (non zero dipole moment)] (circle one) Draw the individual dipoles in your figure above. (2 pts)

c. The primary intermolecular force for the molecule is [(hydrogen bonding) or (dipolar interaction) or (London or VDW forces)] (circle one) (1 pts)

2. If I dissolved 1.56 grams of Na Cl in 100.2 grams of water to make up 101.3 mL of the solution.

a. Show your calculation mass % of Na Cl in solution. (% mass = mass solute/mass solution) (4 pts)

FW NaCl = 23.0 + 35.45 = 58.45 g/mol

$$\text{mass \%} = \left(\frac{1.56\ g}{1.56 + 100.2\ g}\right) * 100 =$$

NaCl H_2O

BA -2
attempt - 1

b. Molality of Na Cl (m = moles solute / kilogram solvent) (4 pts)

BA-2

$$\frac{1.56\ g / 58.45\ g/mol}{100.2\ g\ H_2O \times \frac{1\ kg}{1000\ g}} = \frac{0.02669\ mol}{0.1002\ kg} = 0.267\ m$$

3. If K_b = 0.51 °C kg/mol and the boiling point of water is 100 °C, if I dissolve 2.53 moles of sugar in 100.0 grams of water, what would be the boiling point ? ($\Delta T = K_b\ m_{solute}$) (6 pts)

attempt - 1

$$m_{solute} = \frac{2.53\ mole\ sugar}{100.0\ g\ H_2O} \times \frac{1000\ g}{1\ kg} = 25.3\ m$$

$$\Delta T = (0.51\ ^\circ C\ kg/mol)(25.3\ mol/kg) = 12.9\ ^\circ C$$

BP = 100 °C + 12.9 = 112.9 °C

Extra Credit: For the reaction $2\ NO_2 \rightarrow 2\ NO + O_2$ if the NO_2 rate is 9.0×10^{-3} atm / second, what is the rate of formation of the O_2 in this same interval of time ? Show work or explain. (4 pts)

4.5×10^{-3}

$$2\ mol\ NO_2 \rightarrow 1\ mol\ O_2$$

$$9.0 \times 10^{-3} \rightarrow (9.0 \times 10^{-3}/2)$$