Grossmont College Name: \_\_\_\_\_\_\_\_KEY\_\_\_\_\_\_\_\_\_\_\_\_\_

Chemistry 102, Spring 2017

Quiz (28 points) Date: \_\_\_\_\_\_\_\_\_\_\_\_

1. (2 points) Which of the following will have the largest vapor pressure at a given temperature?

**a. CCl4** b. CH2Cl2 c. CH3Cl d. CH3OH e. CH3CH2OH

1. (4 points) List **all the intermolecular attractive forces** (ion-dipole, London, dipole-dipole, hydrogen bonding**)** in each of the following:

NH3 in water \_\_ **London Dispersion, dipole-dipole, hydrogen bonding** \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Benzene, C6H6 \_\_\_\_ **London Dispersion** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. (4 points) Which substance is able to form hydrogen bonds? **CH3CH2OH** or CH3OCH3? Draw a picture showing the hydrogen bonding interactions.



1. (10 points) Complete the following reaction by providing the products. Make sure the equation is balanced.
2. Draw a triacylglyceride where the three fatty acid portions are oleates (C18:1. Δ9) and then react it with the proper number of sodium hydroxide for complete base hydrolysis (draw product)

glycerol



1. The triglyceride reactant above is a liquid at room temperature. Is it considered a fat or an oil? \_\_\_ oil \_\_\_\_

Why? The Cis fatty acid would be an oil due to the geometry of the cis bond causing the fatty acid to kink and pack very poorly with the fatty acids around it. This kinking causes the other fatty acids to be further away which leads to much weaker London dispersion forces to hold these various fatty acids together

1. Explain briefly why soap makes a good cleanser.

The hydrophobic region attracts dirt and grease. The hydrophilic region allows soap to dissolve into water allowing the dirt to become water soluble

1. (4 points) An ammonia sample at 65.5oC and 524 torr has a volume of 15.3 L. What is the volume when the temperature is -15.8oC at the same pressure?

V­1 = 15.3 L P­1 = 524 torr T1 = 65.5oC + 273.15 = 338.7 K

V2 = ? P­2 = 524 torr T2 = -15.8oC + 273.15 = 257.4 K

V1 / T1 = V2 / T2 V2 = V1 T2 / T1 = (15.3 L) x (257.4 K) / 338.7 K = **11.6 L**

1. (4 points) Using the terms miscible, immiscible, soluble, insoluble, predict the solubility outcome of each set of solute and solvent

The liquid ethanol (CH3CH2OH) in water \_\_\_\_\_\_ miscible \_\_\_\_\_\_\_\_\_\_\_\_

The ionic solid sodium bromide (NaBr) in water \_\_\_\_\_ soluble \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The liquid ethanol (CH3CH2OH) in oil (ex: CH3(CH2)22CH3) \_\_\_\_\_\_ immiscible \_\_\_\_\_\_\_\_\_\_\_\_\_\_

The ionic solid Sr(OH)2 in oil \_\_\_\_\_\_\_ insoluble \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Solubility Rules for Ionic Compounds**

Compounds containing the following ions are generally *soluble* in water:

1. Alkali metal ions and ammonium ion
2. Acetate ion

### Nitrate ion

### Halide ions (X) (AgX, Hg2X2, and PbX2 are insoluble exceptions)

### Sulfate ion (SrSO4, BaSO4, and PbSO4, are insoluble exceptions)

### Compounds containing the following ions are generally *insoluble* in water:

### Carbonate ion (see rule 1 exceptions, which are soluble)

### Chromate ion (see rule 1 exceptions, which are soluble)

### Phosphate ion (see rule 1 exceptions, which are soluble)

### Sulfide ion (CaS, SrS, BaS, and rule 1 exceptions are soluble)

### Hydroxide ion [Ca(OH)2, Sr(OH)2, Ba(OH)2, and rule 1 exceptions are soluble]