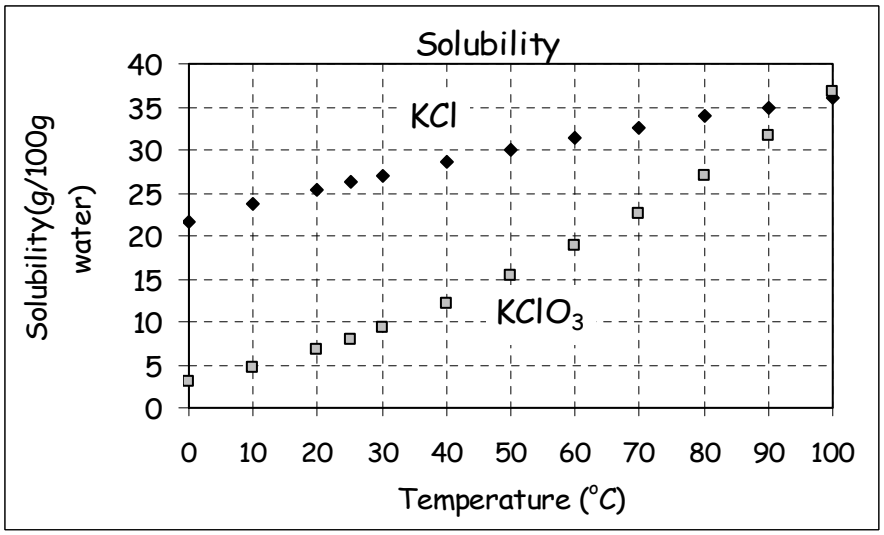
Fall 2004 Name_____
Sinex

CHM 101 EXAM III

Show all calculations with units and correct significant figures. Write in complete sentences. **GOOD LUCK!!!**

1. Here are the solubility curves for potassium chloride and potassium chlorate. (10)



At 25°C, which salt is more soluble?

At 80°C, 20 g KCl and 20 g $KClO_3$ will dissolve in 100 g of water. If you slowly cooled the water down to 10°C, explain what would happen.

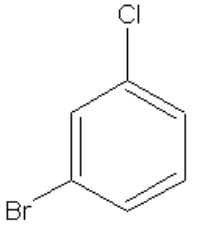
2. A 1.00 g sample of liquid hexane, C_6H_{14} is placed into a 250 mL flask and warmed to 75°C to vaporize the hexane. What is the pressure of hexane in the flask? (10)

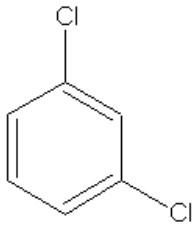
3. For the molecules listed in the table below, draw the Lewis dot structure, illustrate the 3D geometry, indicate the direction (use an arrow) of electron migration for the bonds, and decide if the molecule is polar or non-polar. A table of electronegativity values is attached. (25)

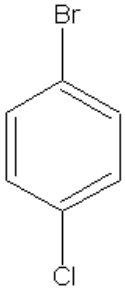
Molecule	Lewis Dot Structure	3D geometry	Electron migration	Polar or Non-polar
CCl_2F_2			C F C Cl	
SF_6			S F	
PCl_5			P Cl	
NBr_3			N Br	
XeF_4				

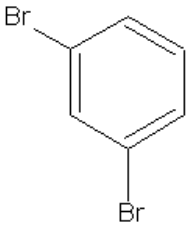
4. Draw the three isomers of PCl_3Br_2. Decide if the isomers are polar or non-polar. (10)

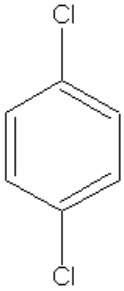
5. Rank the polarity of the following dihalobenzene molecules (1 – most to 5 - least). (10)











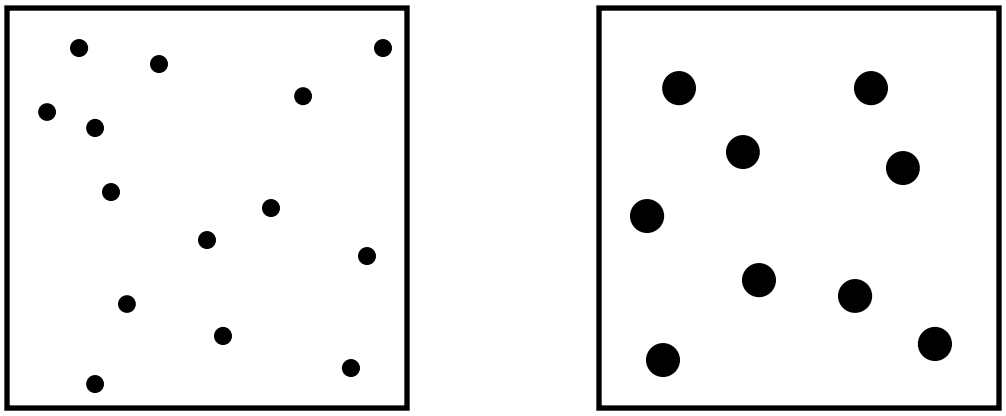
_____ _____ _____ _____ _____

6. How would the boiling points of the dihalobenzenes given above in question 5 rank? (1 – highest to 5 - lowest)

(5)

_____ _____ _____ _____ _____

7. The boxes below illustrate gases where neon is on the left and xenon on the right. (20)



If the neon box is at 25°C, are all the neon atoms moving at the same velocity? Explain why or why not.

If the two boxes were at the same temperature, which box would have the higher velocity? Why?

How could you get the average velocity of both boxes to be the same? Explain.

Why are gases compressible?

For an ideal gas, we assume intermolecular attractions (IMF's) are negligible. Why?

8. Which intermolecular forces or IMF's are operating in the substances listed below? (10)

CH_3Cl (l) HF (l) NaF (l) KCl (aq) CO_2 (aq)