

Study Guide Exam II

Fall 2009

Show logic and calculations for all problems. Remember to include units and be careful with sig. fig.

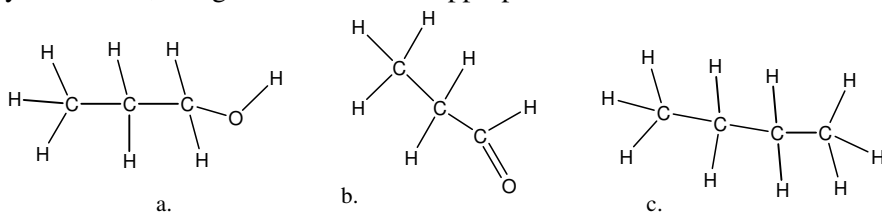
1. Regarding the Boltzmann molecular simulator program used in lecture, would increasing the number of red spheres in the box increase or decrease the pressure? Explain your answer using the Kinetic Molecular Theory.

2. What pressure is exerted by 0.533 moles of Ar(g) at 24.7° C in a 2.500 L container?

3. A syringe if filled with 48.0 mL of air at a pressure of 748 mm Hg. What would the pressure in the syringe be when the volume is decreased to 9.2 mL?

3.5. Name the 3 types of intermolecular attractive forces we considered in lecture. Describe each and indicate any requirements for the formation of each type of interaction.

4. Which of the following compounds would have the highest, intermediate, and lowest boiling point? Explain your answer, using structures where appropriate.



5. What would be the physical state of a compound at room temp that boiled at 55.9 °C and melted at 10.8 °C.?

6. Draw a picture of three molecules of water connected by hydrogen bonds.

7. How many moles of propane (C₃H₈) are present in 500.8 g propane? How many propane molecules are present in this 500.8 g? How many C atoms are present in this sample?

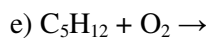
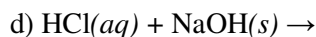
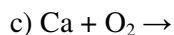
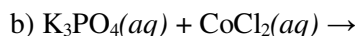
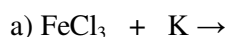
8. What volume of a 15% (w/v) solution of LiOH would be produced if you used 8750 g of LiOH?

9. What is the concentration in molarity units of a solution that has 7.00 g of NaCl dissolved in water to give 520.6 mL of solution?

10. If 83.00 mL of a 3.075 M solution of NaOH is diluted to a final volume of 12.88 L, what will its concentration be?

11. Which of the compounds in Prob. #4 above would you predict to have the highest, intermediate, and lowest solubility in water? Explain your answer, using structures where appropriate.

12. Predict the products of the following reactions & balance the equations.



12. Define reduction

13. A sample of 235.00 g of Ca reacts completely with water to produce an explosive gas.

a) Write a balanced or net ionic chemical equation for the reaction and indicate which reactant is oxidized and which is reduced.

b) How many moles of gaseous product are produced?

Supplemental Information (that you will be provided)

Periodic Table and Electronegativity Table

Equations for temperature: $^{\circ}\text{F} = 1.8 ^{\circ}\text{C} + 32$

$\text{K} = ^{\circ}\text{C} + 273.15$

English to metric conversions

Length: 1 m = 39.47 in

Mass: 1 kg = 2.205 lb

Volume 1 L = 1.057 qt

1 in = 2.54 cm

1 lb = 453.5 g

$R = 0.08205 (\text{L}\cdot\text{atm}/\text{mol}\cdot\text{K})$

1 atm = 760. mm Hg

1 atm = 760. Torr