

November 3, 2000
Fall 2000
Isom

EXAM 3A
Physiological Chemistry I / CHEM 1402

Name: _____

ss#: _____

R = 0.0821 atm L / mol K

Lab: **A** (mon) **B** (wed)

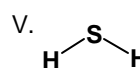
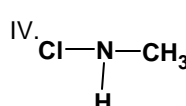
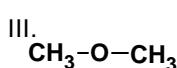
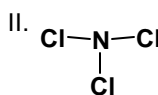
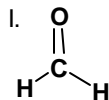
Multiple Choice. Clearly write the letter corresponding to the correct answer in the space provided.
(5 points each)

___1) Which of the following molecules could participate in dipole interactions?

- I. HCl II. CH₂Cl₂ III. NBr₃ IV. CO₂

- (a) I, II, III and IV (b) I, II and III (c) III and IV (d) III only (e) none are polar molecules

___2) Which of the following molecules are hydrogen bond donors?



- (a) I, II, III, IV and V (b) I, IV (c) IV, V (d) I, III and V (e) IV only

___3) Which of the following are characteristics of a catalyst?

- I. increase concentration of products at equilibrium
II. increases rate of reaching equilibrium
III. decrease activation energy
IV. catalyst remains unchanged after reaction

- (a) I, II, III and IV (b) I, II and IV (c) II, III and IV (d) I, II and III
(e) none of these combinations are correct

___4) Which of the following molecules will have the highest boiling point?

- (a) CCl₄ (b) Br₂ (c) NH₃ (d) CH₃-O-CH₃ (e) None of these have boiling points

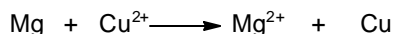
___5) A sample of gas at 25 °C is heated under constant pressure until the volume of the gas is 4 times the original volume. What is the final temperature (in Kelvin) of the gas?

- (a) 75 K (b) 100 K (c) 1192 K (d) 373 K (e) cant determine from the information.

___6) If 2.25 L of a gas at 16°C and 1.00 atm is compressed to a pressure of 125 atm at 25°C, what is the final volume of the gas?

- (a) 0.0186 L (b) 0.0281 L (c) 0.0115 (d) 0.0175 (e) none of the above

___7) In the reaction below, what is the reducing agent?



- (a) Mg (b) Cu²⁺ (c) Mg²⁺ (d) Cu (e) None are reducing agents

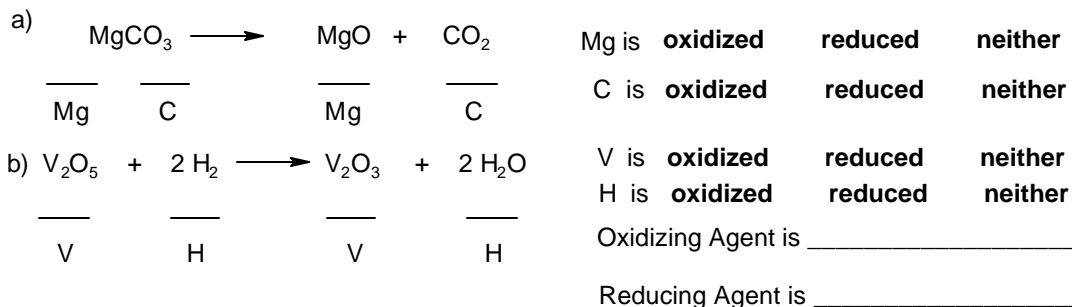
___8) Which of the following is thought to be responsible for global warming?

- (a) CO (b) O₂ (c) CO₂ (d) H₂O (e) none of the above

- ___9) Which of the following is **not** an example of oxidation/reduction reaction?
- (a) Statue of Liberty support beams rusting
 (b) Dental fillings dissolving when next to gold teeth
 (c) when iron is placed in a copper ion solution, copper metal deposits on the surface of iron
 (d) all of the above
 (e) none of the above
- ___10) Inside a cell the partial pressure of O_2 (pO_2) is 15 mmHg and pCO_2 is 75 mmHg while the extra-cellular fluid contains pO_2 of 125 mmHg and pCO_2 is 25 mmHg. Which description below accurately describes the flow of O_2 and CO_2 occurring under these conditions?
- (a) O_2 will move into the cell and CO_2 will move out of the cell
 (b) O_2 will move out of the cell and CO_2 will move out of the cell
 (c) O_2 will move into the cell and CO_2 will move into the cell
 (d) O_2 will move out of the cell and CO_2 will move into the cell
 (e) The partial pressures dont matter only the total pressure.
- ___11) Which of the following substances would most likely be a gas at room temperature?
- (a) CCl_2Br_2 (b) $CH_3-CH_2-CH_3$ (c) CH_3OH (d) $CH_3-CH_2-CH_2Cl$
 (e) cant determine from information given
- ___12) Which of the following will have the highest melting point?
- (a) NaF (b) KBr (c) MgO (d) NaI
 (e) These dont have melting points because they are liquids at room temperature
- ___13) What is the pressure in mmHg of 0.0108 mol of CH_4 in a 0.265 L flask at $37^\circ C$?
- (a) 1.04 (b) 788 (c) 0.124 (d) 94.1 (e) none of the above
- ___14) Which of the following would cause the system to produce more reactants?
- $$N_2 + 3H_2 \rightleftharpoons 2NH_3$$
- (a) adding N_2 (b) removing NH_3 (c) adding H_2 (d) adding NH_3
 (e) none of the above
- ___15) Which is/are always true of an system whose equilibrium constant is 1.0×10^9 ?
- I. at equilibrium, rate of forward reaction = rate of reverse reaction
 II. reactant formation is favored over product formation
 III. product formation is favored over reactant formation
 IV. at equilibrium, concentration of products = concentration of reactants
- (a) I, III and IV (b) I, II and IV (c) I and III (d) I only (e) none are true
- ___16) The pressure is released from a new 2L bottle of Coke then the bottle is resealed. What is true of the resulting CO_2 concentration in the coke an hour after the bottle is resealed?
- (a) the same as original (b) greater than original (c) less than original
 (d) no CO_2 remains in solution (e) cant determine from the information given

Name _____

17) Write the oxidation numbers of all atoms in the space provided. (10 points)



Calculations: Show all your work! **Circle** your final answer. Dont forget units.

17) A balloon filled with helium gas occupies 2.50 L at 25 °C and 1.00 atm. When released it rises to an altitude where the pressure is 0.800 atm and the volume of the gas is now 3.1 L. What is the temperature (in °C) at this altitude? (5 points)

18) Draw the intermolecular forces existing between 1 molecule of H₂O surrounded by 3 others. Draw intramolecular bonds with solid lines, intermolecular forces with dashed lines. Clearly label each atom with its appropriate partial charges. (5 points)

Name the type of intermolecular force is present ? _____