

November 3, 2000  
Fall 2000  
Isom

**EXAM 3B**  
**Physiological Chemistry I / CHEM 1402**

Name: \_\_\_\_\_

ss#: \_\_\_\_\_

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

**R = 0.0821 atm L / mol K**

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

\_\_\_1) Inside a cell the partial pressure of O<sub>2</sub> (pO<sub>2</sub>) is 15 mmHg and pCO<sub>2</sub> is 75 mmHg while the extra-cellular fluid contains pO<sub>2</sub> of 125 mmHg and pCO<sub>2</sub> is 25 mmHg. Which description below accurately describes the flow of O<sub>2</sub> and CO<sub>2</sub> occurring under these conditions?

- (a) O<sub>2</sub> will move into the cell and CO<sub>2</sub> will move out of the cell
- (b) O<sub>2</sub> will move out of the cell and CO<sub>2</sub> will move out of the cell
- (c) O<sub>2</sub> will move into the cell and CO<sub>2</sub> will move into the cell
- (d) O<sub>2</sub> will move out of the cell and CO<sub>2</sub> will move into the cell
- (e) The partial pressures dont matter only the total pressure.

\_\_\_2) Which of the following substances would most likely be a gas at room temperature?

- (a) CCl<sub>2</sub>Br<sub>2</sub> (b) CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>3</sub> (c) CH<sub>3</sub>OH (d) CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>Cl
- (e) cant determine from information given

\_\_\_3) 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

\_\_\_4) Which of the following would cause the system to produce more reactants?



- (a) adding N<sub>2</sub> (b) removing NH<sub>3</sub> (c) adding H<sub>2</sub> (d) adding NH<sub>3</sub>
- (e) none of the above

\_\_\_5) The pressure is released from a new 2L bottle of Coke then the bottle is resealed. What is true of the resulting CO<sub>2</sub> 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<sub>2</sub> remains in solution (e) cant determine from the information given

\_\_\_6) Which is/are always true of an system whose equilibrium constant is 1.0 X 10<sup>0</sup>?

- 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

\_\_\_7) 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

\_\_\_8) 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

\_\_\_9) Which of the following molecules could participate in dipole interactions?

- I. HCl      II. CH<sub>2</sub>Cl<sub>2</sub>      III. NBr<sub>3</sub>      IV. CO<sub>2</sub>

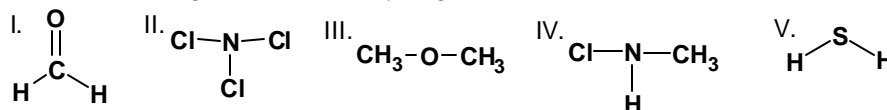
- (a) I, II, III and IV    (b) I, II and III    (c) III and IV    (d) III only    (e) none are polar molecules

\_\_\_10) 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

\_\_\_11) 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

\_\_\_12) Which of the following molecules will have the highest boiling point?

- (a) CCl<sub>4</sub>    (b) Br<sub>2</sub>    (c) NH<sub>3</sub>    (d) CH<sub>3</sub>-O-CH<sub>3</sub>    (e) None of these have boiling points

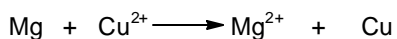
\_\_\_13) A sample of gas at 25 °C is heated under constant pressure until the volume of the gas is 4 times the original volume. What is the final temperature (in Kelvin) of the gas?

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

\_\_\_14) What is the pressure in mmHg of 0.0108 mol of CH<sub>4</sub> in a 0.265 L flask at 37°C?

- (a) 1.04    (b) 788    (c) 0.124    (d) 94.1    (e) none of the above

\_\_\_15) In the reaction below, what is the reducing agent?



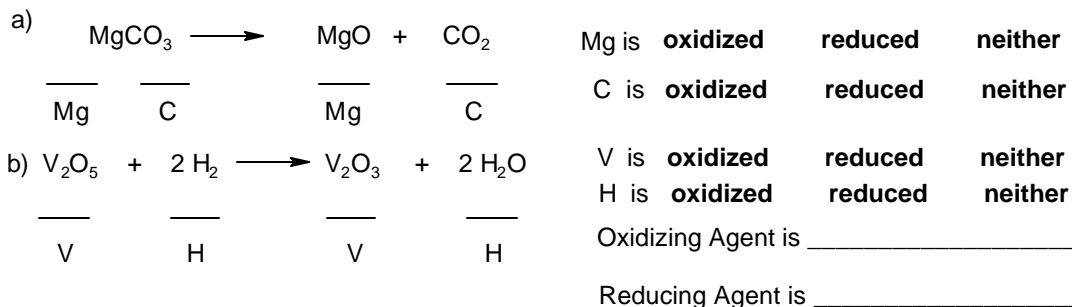
- (a) Mg    (b) Cu<sup>2+</sup>    (c) Mg<sup>2+</sup>    (d) Cu    (e) None are reducing agents

\_\_\_16) Which of the following is thought to be responsible for global warming?

- (a) CO    (b) O<sub>2</sub>    (c) CO<sub>2</sub>    (d) H<sub>2</sub>O    (e) none of the above

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 0.700 atm and the volume of the gas is now 3.5 L. What is the temperature (in °C) at this altitude? (5 points)

18) Draw the intermolecular forces existing between 1 molecule of H<sub>2</sub>O 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 ? \_\_\_\_\_