

Time: 85 minutes

Chemistry 101  
Lab. Final

June 4, 1999  
H. Deeb

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

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

Student No: \_\_\_\_\_

Section: \_\_\_\_\_

Grading :

I ...../60

II...../12

III...../16

IV...../12

Total:            /100

10/21 SW

GOOD LUCK

Circle the letter that precedes the correct answer in each of the following. (There is only one correct answer).

- During titration the student was obliged to fill the buret twice to transfer a certain volume (V mls). The uncertainty of the transferred volume is:

- a-  $\pm 0.04$  ml
- b-  $\pm 0.02$  ml
- c-  $\pm 0.08$  ml
- d- cannot be predicted

- Report the answer of the following arithmetic operation to the correct number of significant figures:  $\frac{6.843 \times 10^5}{12.09 + 20.0}$

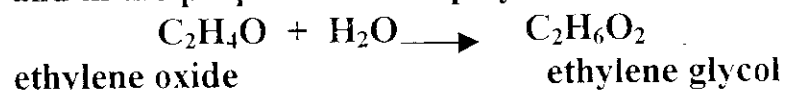
- a-  $0.2132 \times 10^5$
- a-  $0.213 \times 10^5$
- b-  $0.02131 \times 10^4$
- c-  $2.1 \times 10^4$

- Report the answer of the following arithmetic operation to the correct number of significant figures using scientific notation:

$$\frac{(8.201 \times 10^3) + (2.04 \times 10^2)}{2.22 \times 10^{-2}}$$

- a-  $37.86 \times 10^4$
- b-  $3.78 \times 10^5$
- c-  $37.9 \times 10^4$
- d-  $3.79 \times 10^5$

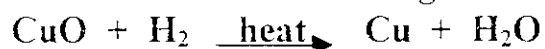
- The industrial preparation of ethylene glycol used as an antifreeze and in the preparation of a polyester fiber is as follows:



If 165g of ethylene oxide is allowed to react with 75.0g of  $\text{H}_2\text{O}$ , calculate the maximum weight of ethylene glycol that can be obtained:

- a- 233g
- b- 259g
- c- 3.75g
- d- 240g

- Calculate the no. of moles Cu atoms produced if 4.25 liters of H<sub>2</sub> measured at 20.0°C and 766mm Hg reacts with excess of CuO:



- a- 0.190 mole
- b- 0.178 mole
- c- 4.25 moles
- d- 2.61 moles

- 27.5mls of 0.0500 M H<sub>2</sub>SO<sub>4</sub> are needed to neutralize 39.5mls of NaOH solution where both hydrogen ions of H<sub>2</sub>SO<sub>4</sub> react. The normality of NaOH solution is:

- a- 0.0398 N
- b- 0.159 N
- c- 0.0696 N
- d- 0.0199 N

- The best solvent used to dissolve KHP is:

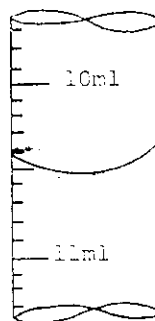
- a- HCl
- b- NaOH
- c- water
- d- ethanol

- Which of the following statements is not related to neutralization reaction:

- a- The reaction is usually fast. ✓
- b- The oxidizing agent has to be strong.
- c- Can be used to determine the concentration of one of the reactants.
- d- Such reactions are usually exothermic.

- The buret above reads:

- a- 11.45 ml
- b- 10.54 ml
- c- 10.50 ml
- d- 10.5 ml



- 50ml of a solution of  $\text{H}_2\text{SO}_4$  with unknown concentration is titrated to the phenolphthalein end point with 10.0ml of 1.00M of NaOH. The concentration of  $\text{H}_2\text{SO}_4$  is:
  - a- 5.0 M
  - b- 1.0 M
  - c- 0.20 M
  - d- 0.10 M
- A student isolates 35.8g of AgCl from a photographic emulsion. What is the maximum amount of silver metal he could recover from this?
  - a- 26.9g
  - b- 3.02g
  - c- 0.331g
  - d- None of the above
- What will occur if a block of copper metal is dropped into a beaker containing a solution of 1M  $\text{ZnSO}_4$ :
  - a- The copper will dissolve with no other change.
  - b- The copper will dissolve with evolution of  $\text{H}_2$  gas.
  - c- Blue precipitate will form.
  - d- No reaction will occur.

0.4 M  $\text{ZnSO}_4$

- A student weighs an amount of NaCl placed on a piece of filter paper. The paper weighs 0.455g and the total weight is 11.085g. He dissolves the salt in distilled water in a 200ml volumetric flask and then adds water to the line. What is the concentration of NaCl in moles/liter:

- a- 0.9095 moles/liter
- b- 3.106 moles/liter
- c-  $9.095 \times 10^{-4}$  moles/liter
- d- 0.03638 moles/liter

- The least accurate of the volumetric measuring devices is the:

- a- Pipet
- b- Buret
- c- Volumetric flask
- d- Graduated cylinder

- Which of the following statements is incorrect?

- a- KHP acts as a strong acid.
- b- A set of results with the least % error is the most accurate.
- c- Lattice energy is the energy released when an ionic compound is dissociated.
- d- The rate of diffusion of  $N_2$  is less than that  $NH_3$

- The equivalent weight of  $Na_2C_2O_4$  in a reaction that leads to the formation of  $CO_2$  is:

- a-  $\frac{\text{Molecular weight}}{2}$
- b- Molecular weight
- c- Molecular weight x 2
- d- Cannot be predicted, since the complete equation is not given.

II- 4.296 milliequivalents of oxalic acid, prepared at a certain temperature, required 30.05ml of NaOH solution to be completely neutralized.

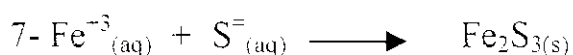
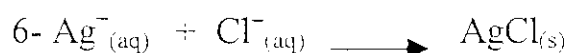
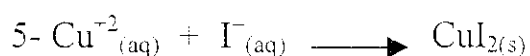
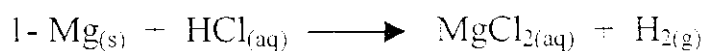
a. Calculate the normality of NaOH solution.

b. Calculate the number of moles of oxalic acid.

c. Calculate the solubility of oxalic acid (g /100c.c) if the above amount of oxalic acid was dissolved in 20.0ml of H<sub>2</sub>O to obtain a saturated solution at the above temperature.

d. Knowing that the solubility of oxalic acid is 14.3 g/100c.c at 20°C. Is the temperature at which the above oxalic acid solution was prepared lower or higher than 20°C. Explain briefly.

III- Consider the following set of unbalanced equations, label the wrong equations by writing the corresponding number in the space provided below and correct each of the wrong equations by writing the complete balanced equation.



a- The wrong equations are:

The correct equations are:

• Nitrogen dioxide gas exists in equilibrium with:

- a-  $\text{N}_2\text{O}_4$
- b-  $\text{HNO}_3$
- c-  $\text{N}_2 + \text{O}_2$
- d-  $\text{NO} + \text{O} \cdot$

• Reactant formation in an endothermic reaction would be favored by which of the following?

- a- An increase in temperature.
- b- A decrease in temperature.
- c- No change in temperature.
- d- None of the above.

• How much barium nitrate is required to prepare 250.0ml of 0.1000M solution?

- a-  $1.254 \times 10^{-4}$  g
- b- 2.500 g
- c- 4.984 g
- d- None of the above

•  $40 \text{ dm}^3$  of an ideal gas at  $25^\circ\text{C}$  and 750mm Hg is expanded to  $50 \text{ dm}^3$ . The pressure of the gas changed to 765mm Hg. What is the final temperature of the gas:

- a- Temperature remains unchanged.
- b- 365 K
- c- 31.9 K
- d- 380 K