Palestine Technical University- Kadoorie

Course's Name: General Chemistry lab (1)
Course's Number: 10550105
Exam's Period: 60 min
Questions' Number:9
Total Mark: : 40
Pages' Number: 3

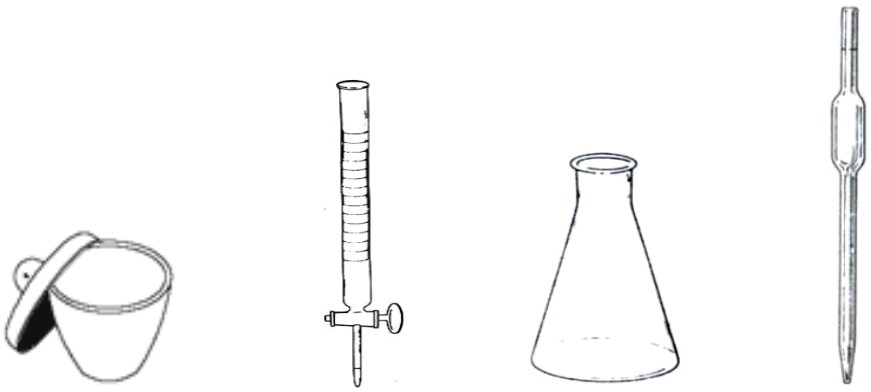
Instructor's Name: ……..
Student's Name:……
Student's Number:……...
Section's Number:…….
Exam's Date: 08/12/2016

Final Exam
First Semester 2015/2016

(Molar mass in g/mol, $BaCl_2$. $2H_2O$ = 244, Na_3PO_4. $12H_2O$ = 380, $Ba_3(PO_4)_2$ = 601, $CaSO_4$ = 136, H2O = 18.0, NaOH = 40, HCl = 36.5, O=16, Mg=24.3)

Q1: Labware and safety — 14 points

1-Name each of these glasswares?



2-What is the meaning of each of the following hazard symbols?

3- Fill in the blanks with the correct answer

- ---------- is used to measure accurate volume of liquid.
- ---------- is added to detect the end point during titration.
- ---------- is used to heat the crucible with hydrated salt

4- Which of the following statement is correct in relation to Lab. Safety?

- If chemicals get in your eyes, rinse them with water at the eyewash fountain for 15 minutes, then report to your instructor. ☐
- All chemical must be handled with care in the Lab., they always must be treated as toxic materials ☐
- The safest place for concentrated acids and bases is fumes hood ☐

Q2: Exp. 2 The Density **2 points**

A rectangular piece of aluminum has a length of 4.53 cm and width equals 6.98 cm. Calculate the thickness in (μm) of the aluminum piece if the mass of the piece equals 0.13 g and the density of aluminum equals 2.70 g/mL.

(a) 1.52 (b) 15.2 (c) 0.0152 (d) 15200

Q3: Exp. 4 Hydrated salt **2 points**

A 4.88 g sample of $CaSO_4$. X H_2O was heated in crucible to evaporate water. After heating and cooling the mass remaining in crucible is 2.72 g. The percent water in hydrated salt (**$\%H_2O$**) is

(a) 44.26% (b) 55.74% (c) 66.17% (d) 100%

Q4: Exp. 5 Empirical formula **4 points**

Given the following set of data for the determination of empirical formula of magnesium oxide:

- Mass of empty crucible: **26.40g**
- Mass of magnesium and crucible before heating: **27.26g**
- Mass of product (magnesium oxide) and crucible after heating: **27.80g**

The empirical formula of the resulting oxide is:…… [Show your calculations]

2-In the Lab., some students calculated the empirical formula to be Mg_2O instead of MgO, explain why?

Q5: Exp. 6 Limiting reactant **5 points**

A 4.83 g sample mixture of $BaCl_2$. $2H_2O$ and $Na_3PO_4.12H_2O$ was boiled in 150 mL distilled water. The precipitate, $Ba_3(PO_4)_2$, was separated by filtration, dried and weighed a mass of 1.68 g. Barium ions (Ba^{+2}) were added to filtrate and white precipitate was formed. Given the equation of the reaction

$3BaCl_2 . 2H_2O + 2Na_3PO_4. 12H_2O \longrightarrow Ba_3(PO_4)_2 + 6NaCl + 30\ H_2O$

1- The limiting reactant is ----------

2- The mass of limiting reactant is

(a)2.05 (b)3.15 (c)1.68 (d)1.22

3- The mass of the excess reactant is

(a)3.15 (b)2.78 (c)1.68 (d)1.00

Q6: Exp. 7 Net ionic Equation **4 points**

Write the net ionic equations and the evidence of reaction for the following:

- Na_2CO_3 + HCl

- NaCl + $AgNO_3$

Q7: Exp. 8 Volumetric analysis **2 points**

A student titrates a 20.00 mL sample of a solution of HCl with unknown molarity. The titration requires 20.05 mL of a 0.1819 M solution of NaOH. What is the molarity of the HCl solution?

(a) 0.1824 (b) 0.09120 (c) 0.3648 (d) 912.0

Q8: Exp. 10 Molar mass of a volatile liquid **4 points**

A sample of volatile liquid in 200 mL flask is heated in boiling water bath at temperature of 96.0 ^{o}C for 5 Min. After cooling and drying the flask, the mass of remaining vapor is 0.67g.

1- Calculate the molar mass of the volatile liquid given that pressure = 740 mmHg and R = 0.0821 atm.L/mol.K.

(a)5.19 g/mol (b)57.5 g/mol (c)0.104 g/mol (d) 104 g/mol

2- If the liquid sample does not completely evaporated, what will happen to the molar mass value. Explain?

Q9: Exp. 11 Calorimetry **3 points**

1- A sample of 50.0 mL of a 1.1 *M* solution of HCl at 18 $^{\circ}$C was mixed with 50.0 mL of 1.0 *M* NaOH at 19 $^{\circ}$C in a coffee cup calorimeter. After mixing, the temperature rose to 26 ^{o}C, What is the enthalpy change (ΔH) for the neutralization reaction which occurred?

(a)3135 J/mol (b)62.7KJ/mol (c)3135KJ/mol (d)62.7J/mol

2- Will the experimental value of (ΔH) for the neutralization which calculated in part 2 be smaller or larger than the theoretical value? Explain why?

End of Questions