Palestine Technical University- Kadoorie

Course's Name: General Chemistry lab (1)
Course's Number: 10550105
Exam's Period: 80 min
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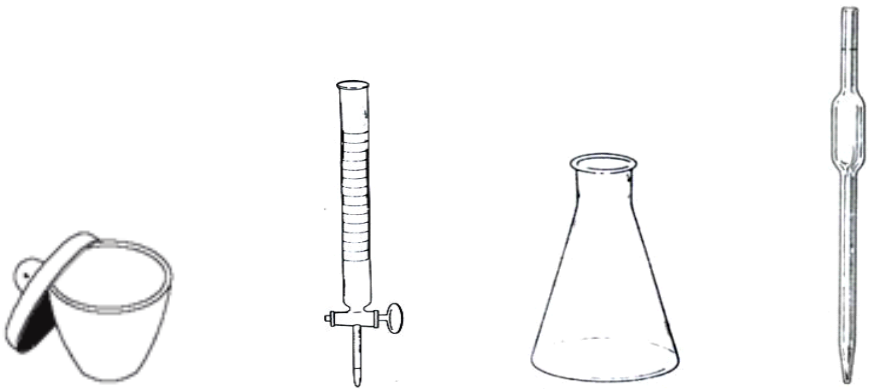
Instructor's Name: ……..
Student's Name:……
Student's Number:……...
Section's Number:…….
Exam's Date: 17/5/2016

Final Exam
Second 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, S=32.06, Fe=55.85)

Q1: Labware and safety — 10 points

1-Name each of these glasswares?



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

3- Draw a nonluminous Bunsen burner flame, showing all regions of the flame and the hottest part?

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 **3 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 .

1-The value of X will be

(a) 5 (b) 6 (c) 2 (d) 7

2- How does the value of **X** affect if the hydrated salt is overheated and the anhydrous salt thermally decomposes, one product being a gas?

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

A sample of pure iron is covered with an excess of powdered elemental sulfur. The following data were collected:

Mass of crucible and lid (*g*)	19.746
Mass of iron, crucible, and lid (*g*)	20.422

The mixture was heated to a temperature where a reaction occurred and the excess sulfur was volatilized. Upon cooling, the following was recorded.

Mass of compound, crucible, and lid (*g*)	21.195

1-The empirical formula of the iron and sulfur compound will be

(a) FeS (b) Fe_2S (c) FeS_2 (d) Fe_2S_3

2-In determining the empirical formula of magnesium oxide (Mg_xO_y) experiment, some students calculated the empirical formula to be Mg_2O instead of MgO, which is the theoretical empirical formula, 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 **3 points**

1- 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

2- What is the name of the indicator used in titration experiment?

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 **5 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