Name.....Student I.D.....

Seat No.

King Mongkut's University of Technology Thonburi

Final Examination, Second Semester (2/2013)

Course: CHE 212 ~~Organic and Physical Chemistry Laboratory~~ Industrial Organics Chemistry Lab Chemical Engineering, 2nd year

Date: 15 May 2014 Time: 09:00 – 12:00

Please follow the instructions.

1. Close book examination.
2. The exam is divided into 3 sections, 10 pages, including the covering page.
3. Answer each question in the provided space.
4. Write your full name, student ID and seat number on every page otherwise your exam paper will not be graded.
5. A calculator is allowed in the exam.
6. Use blue-ink or black-ink pen only. The exam that is written by pencil will not be graded.

After you have finished with the examination, raise your hand for permission to leave the examination room,

Students are not allowed to take the examination paper out of the examination room.

If any disallowable material is found in your occupation in the examination room, you will be punished as serious as retirement.

Asst. Prof. Dr. Jindarat Pimsamarn

Asst. Prof. Dr. Panchan Sricharoon

Asst. Prof. Dr. Ampai Chanachai

Lecturers

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This exam is evaluated by the committee of the Department of Chemical Engineering

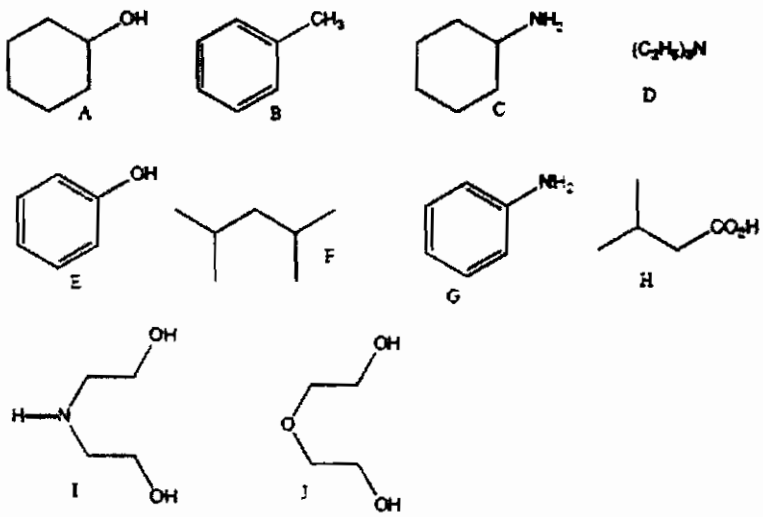
Assoc. Prof. Dr. Piyabutr Wanichpongpan

Head of Department

Part 1 LAB1 and LAB9 (Aj. Jindarat)

LAB1 : IDENTIFICATION OF ORGANIC COMPOUND. (10 points)

1. Refer to compounds A-J below. (5 points)



1.1 Which compounds are completely soluble in water? .....

1.2 Which compounds are completely insoluble in water? .....

1.3 Which compounds are partially soluble in water? .....

2. Which method is used to differentiate among the primary, secondary and tertiary alcohol? (2 points)

....

3. Explain the difference of these 3 alcohols: primary, secondary and tertiary alcohol. (3 points)

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LAB8 : GAS CHROMATOGRAPHY (10 points)

1. Why is it important to avoid air bubbles in the column during chromatography? (5 points)

2. Explain the effect of Gas Flow Rate to the separation by GC. (5 points)

Part 2 LAB4, LAB6, LAB7 and LAB9 (Aj. Panchan)

LAB 4: PARTIAL MOLAR VOLUMES OF SODIUM CHLORIDE SOLUTION (10 points)

1. Explain the experiment and calculation method to find the partial molar volumes of substance in the solution. (6 points)

2. What are the partial molar volume and apparent molar volume of solute? (4 points)

Lab 6: CHEMICAL REACTION OF IODIDE AND PERSULFATE ION: PART 1 RATE EQUATION (10 points)

1. Write the stoichiometric reaction for the system that contains persulfate, idodide, and thiosulphate ions and starch. (2 points)

2. Explain the concept how you can investigate the reaction rate for the system in question 1. (3 points)

3. If the clock reaction is not used for finding the reaction rate, briefly suggest any possible technique to find the reaction rate. (2 points)

4. Based on the results from this laboratory, explain how we can calculate the order of the reaction with respect to persulfate ions. (3 points)

Lab 7: CHEMICAL REACTION OF IODIDE AND PERSULFATE ION: PART 2 EFFECT OF TEMPERATURE

(10 points)

1. From the results in this laboratory, explain the effect of temperature on the reaction between iodide and persulfate ions. (3 points)

2. The reaction between iodide and persulfate ions is called exothermic or endothermic? Sketch the energy level of the reactants and the products. (3 points)

3. Explain the important of finding the activation energy. (2 points)

4. Write the Arrhenius equation that relate the rate constant and temperature. (1 point)

Lab 9: IDEALITY OF SOLUTIONS FROM SOLUBILITY CURVES (10 points)

1. Explain why we have to study the ideality of solutions. (2 points)

2. Sketch the solubility of naphthalene in toluene and in hexane at different temperatures and discuss. (5 points)

3. Explain the relation between mole fraction and solubility of naphthalene in this experiment. (3 points)

Part 3 LAB2, LAB3 and LAB5(Aj. Ampai)

LAB2 : MELTING POINT OF ORGANIC COMPOUND (10 points)

1. Melting point of substance is almost independent of pressure. Why? (3 points)

2. You have a sample that you are not sure if it is benzophenone or not. Using only melting point technique, explain how you can prove that it is Benzophenone. (Assume that you can have any compound you need.) (5 points)

3. Why the sample should be packed tightly in the capillary tube? (2 points)

LAB3 : VISCOSITY OF POLYMER SOLUTION (10 points)

1. Solution viscosities for a particular polymer and solvent are plotted in the form of $(\eta-\eta_0)/(c\eta_0)$ versus c, where η is the viscosity of the polymer solution at concentration c in g/cm^3 and η_0 is the viscosity of the pure solvent. The plot is a straight line with intercept of 1.50 cm^3 /g and a slope of 0.9 cm^6/g^2. Give the magnitude and the units for the Huggin's constant for this polymer-solvent pair. (7 points)

2. Why diameter of Oswald viscometer should be small? (3 points)

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LAB5 : SAPONIFICATION REACTION (10 points)

1. In sponification experiment, why NaOH is dissolved in ethanol instead of water? (3 points)

2. In saponification experiment, why reactants are heated using water bath instead of directly heat with heater? (3 points)

3. In saponification experiment, why the reactant solution (oil & NaOH) have to be heated? (4 points)