CHM 246 Revised: Fall 2020

Virginia Western Community College CHM 246 Organic Chemistry Laboratory II

Prerequisites

CHM 241 and CHM 245

Corequisites

CHM 242

Course Description

Includes qualitative organic analysis. Offered in the spring semester.

Semester Credits: 2 Lecture Hours: 1 Laboratory Hours: 3

Required Materials

Textbook:

Experimental Organic Chemistry: A Miniscale and Microscale Approach. Gilbert, et al. 5th edition. Cengage Publishing. ISBN: 9781439049143

Course Outcomes

At the completion of this course, the student should be able to:

- Pursue basic procedures and techniques employed in modern organic chemistry laboratories.
- Develop skills in methods of preparation, purification, and identification of organic compounds using infrared spectroscopy.
- Visualize the practical application of the reactions presented in CHM 241/242.
- Perform qualitative organic analysis for separating and identifying unknown organic mixtures using learned methods.

Topical Description

Exp. #	Reading Assignments	<u>Experiments</u>
1	Organometallic Chemistry	A. Preparation of Grignard Reagents (Pages 643-645)
	(Sect. 19.1-19.2; pages 639-643)	C. Preparation of Triphenylmethanol (pages 652-
	(Sect. 19.3-19.4; pages 649-651)	653)
2	Electrophilic Aromatic Substitution	A. Nitration of Bromobenzene (Pages 515-517)
	(Sect. 15.1; pages 491-492)	
	Nitration of Bromobenezene (page 513-	
	515)	
	Exercises: 3, 4, 5, 17 (page 519-520)	
3	Relatives Rates Electrophilic Aromatic	A. Relative Rates of Electrophilic Aromatic
	Substitution	Bromination (pages 525-527)

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(Sect. 15.5; page 522-524) Exercises: 1, 11, 12 (Page 527-529) 4 Esterification of Acid Synthesis of Methyl Salicylate (handout) 5 Reduction of Carbonyl Compounds; Reduction of 9-Fluorenone (page 582-584) Preparation of Alcohols (Sect. 17.4; page 581) Exercises 1, 2, 3, 6, 7, 9, 10 (page 584-585) 6 Kinetic and Thermodynamic Control of a Lab Pages 451-453 Reaction A. Preparation of Cycolhexanone Semicarbazone (Sect. 13; page 445-450) B. Preparation of 2-Furaldehyde Semicarbazone Exercises: 1, 2, 4, 5, 6 (page 453-456) C. Reaction of Semicarbazide with Cyclohexanone and 2-Furaldehyde in Phosphate Buffer Solution D. Reaction of Semicarbazide with Cyclohexanone and 2-furaldehyde in Bicarbonate Buffer Solution E. Test of Reversibility of Semicarbazone Formation 7 The Cannizzaro Reaction Base-Catalyzed Oxidation-Reduction of Aldehydes by (Sect. 16.3; page 553-554) the Cannizzaro Reaction (page 555-557) Exercises: 1, 2, 5, 6, 7, 8, 9 (page 557-559) 8 Preparation of Aldehydes and Ketones by A. Oxidation of Cyclododecanol to Oxidation of Alcohols Cyclododecanone (page 543-544) (Sect. 16.2; page 539-542)

After finishing Exp. #8, we will talk about #9 below that will be the lab for the rest of the semester.

9 Identifying Organic Compounds (Chapter 25; page 833-904) (8 weeks)
Each student (or pair) will receive six singles and two doubles unknowns. Follow systematic procedure for identification of organic compounds as outlined in the lab textbook, page 835-846.
Pay attention to page 842 – the solubility data can be a great help.
Classification Tests for Functional Group Identification are summarized on page 844-845.
No derivatives will be prepared.
Procedure for classification tests for function groups begins on page 856.

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Notes to Instructors

1. Approved safety goggles are still required to be worn in the laboratory. The laboratory working area also includes the weighing room and the sinks. **NO GOGGLES—NO LAB**.

- 2. Each lab report is grade on a scale from 0 100. Pre-lab questions are worth approximate 10 percent and post-lab questions, if any, are worth approximately 15 percent of each lab grade. Lab reports are due one week from the date of completion. These reports must be typed on 8 ½ x 11 letter-size paper. The format for writing lab reports will be explained in the class before each lab. Five points will be taken off per school day for each late lab report.
- 3. The final grade for CHM 245 will be based on the following:

Lab Reports	=	75%
Final Exam	=	25%
Grading Scale		
100% - 90%	=	Α
89.9% - 80%	=	В
79.9% - 70%	=	С
69.9% - 60%	=	D
Less than 60%	=	F