



NATIONAL OPEN UNIVERSITY OF NIGERIA
UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESS WAY,
JABI - ABUJA.
FACULTY OF SCIENCES
DEPARTMENT OF CHEMISTRY
2024 / 1 EXAMINATION

COURSE CODE: CHM 305
COURSE TITLE: ORGANIC CHEMISTRY III
COURSE UNIT: 3
TIME: 3 HOURS
INSTRUCTION: Answer question one and any other three questions.

QUESTION ONE

(1a) Provide the chemical structure and IUPAC name of the product obtained when butanol reacted with acidified potassium dichromate. What is the practical significance of this reaction? (5 marks)

(1b) Arrange the following in order of decreasing acidity: 2-bromobutanoic acid, butanoic acid, 3-bromobutanoic acid, 2-methylbutanoic acid, and 3-methylbutanoic acid (Use the chemical structures of the compounds). (10 marks)

(1c) Review the solubility of carboxylic acids in water. (5 marks)

(1d) Show the detailed steps in the reaction of Grignard reagent and carbon(IV) oxide. (5 marks)

QUESTION TWO

(2a) Write out the general formula for ethers and give examples of three ethers you know. (4 marks)

(2b) Using an alkene, discuss the concept of oxymercuration-demercuration in the synthesis of ether (Detailed chemical structure only). (6 marks)

(ii) Mention three methods of preparing epoxides (Chemical structures compulsory). (5 marks)

QUESTION THREE

(3a) With the aid of chemical structures, illustrate five methods of synthesizing alcohol. (10 marks)

(3b) Why is water more acidic than alcohol? (5 marks)

QUESTION FOUR

(4a) List three ways of ensuring that primary alcohols are oxidized to aldehydes only when using acidified potassium heptaoxodichromate. (4^{1/2} marks)