

KABARAK



UNIVERSITY

UNIVERSITY EXAMINATIONS

2009/2010 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF EDUCATION SCIENCE

COURSE CODE: CHEM 212

COURSE TITLE: ORGANIC CHEMISTRY II

STREAM: SESSION III

DAY: THURSDAY

TIME: 9.00 – 11.00 A.M.

DATE: 12/08/2010

INSTRUCTIONS:

- Attempt all questions
- Total marks = 70 (each question = 17.5 marks)

PLEASE TURNOVER

1. (a) Define the following terms; Chiral centre, enantiomers, optical activity and diastereomers. (4 mks)

(b) Identify a chiral centre in each of the following compounds. Draw three dimensional structures and name their enantiomers using R/S notation

(i) 1,3- dichlorobutane (2 mks)

(ii) 1,2- dibromopropane (2 mks)

(iii) 3-methylpentane (2 mks)

(c) (i) What does E and Z designation mean in the nomenclature of alkenes? (1 mk)

(ii) Draw the three-dimensional formulas and name using E/Z notation for the stereoisomer of 3-bromo-2-hexene. (3 mks)

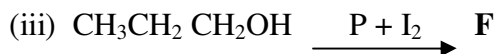
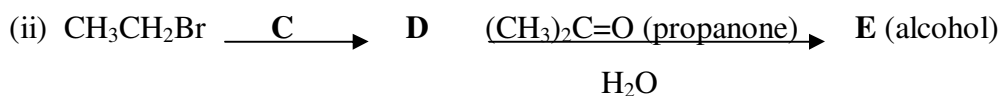
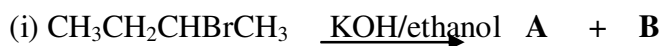
(iii) Draw the structural formula for (E)-1-bromo-3-Chloropropene. (1 mk)

(iv) Give the Newman's conformational isomers of 2-bromo-3-chlorobutane. (2.5 mks)

2. (a) Give the mechanism for the reaction of Tert-butylchloride with NaOH solution to give tert-butylalcohol. Name the type of reaction. (4.5 mks)

(b) Describe with the use of equations how 2-bromo-2,3-dimethylbutane can be prepared from 3,3-dimethyl-1-butene. Give the mechanism of the reaction. (5 mks)

(c) Complete the following reaction equations: (5 mks)



(d) Define the following expressions: (i) polar protic solvent (iii) Polar aprotic solvent. (3 mks)

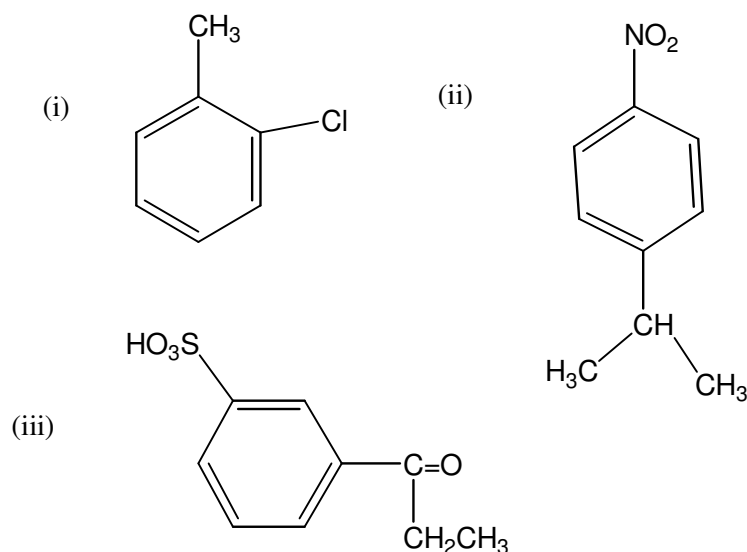
3. (a) Give the structural formulas for the following compounds: (4 mks)

(i) 4-methyl-3-hexen-1-ol (ii) Cyclohex-1, 4-dien-3-ol

(iii) *p*-isopropyl nitrobenzene (iv) *m*-aminophenol.

(b) Define the following terms: (i) electrophile (ii) Ring activating group (iii) Ring deactivating group (iv) nucleophile (4 mks)

- (c) Give the mechanism for the dehydration of 3,3-methyl-2-butanol using conc. Sulphuric acid to give two alkenes. Name the major and minor products of the alkenes. (6.5 mks)
- (d) Explain chemical analysis used to classify alcohols into 1°, 2°, and 3° alcohols. (3 mks)
4. (a) Give the mechanism for the nitration of benzene using Nitric acid in presence of dil. Sulphuric acid. (5 mks)
- (b) Starting from benzene and any other reagents show using equations how the following compounds are synthesized. (9 mks)



- (c) Describe with the use of equations an industrial process used to manufacture phenol. (3.5 mks)