

CHUKA



UNIVERSITY

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RESIT/SPECIAL EXAMINATION

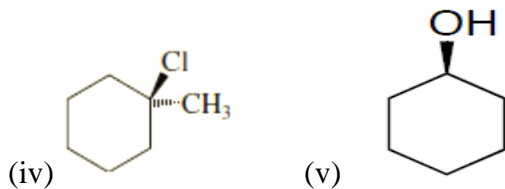
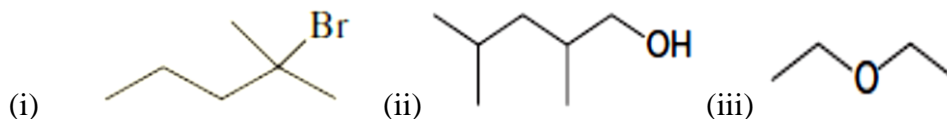
**EXAMINATION FOR THE AWARD OF DEGREE
OF BACHELOR OF EDUCATION SCIENCE & BACHELOR OF SCIENCE
(CHEMISTRY, INDUSTRIAL CHEMISTRY, BIOCHEMISTRY, BIOMEDICAL
SCIENCE & TECHNOLOGY AND BIOLOGY & MATHEMATICS)**

CHEM 231: ORGANIC CHEMISTRY II

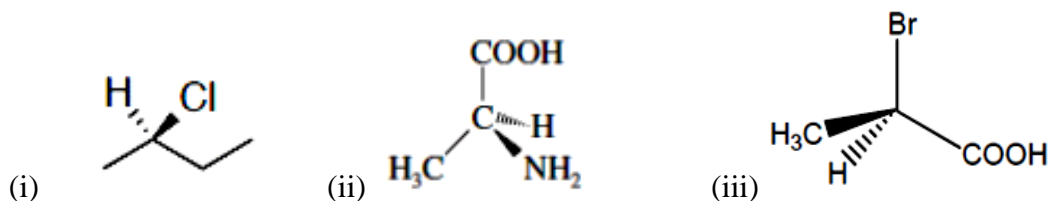
**SREAMS: BED SCI & BSC (Chem, Industrial chem, Biochem, Biomed Sci & Technology,
Biol and Maths) TIME: 2 HOURS**

DAY/DATE: TUESDAY 17/11/2020**2.30 P.M. – 4.30 P.M.****INSTRUCTIONS: Answer ALL questions****QUESTION ONE (30 MARKS)**

a) Give the IUPAC names of the following molecules (5 marks)

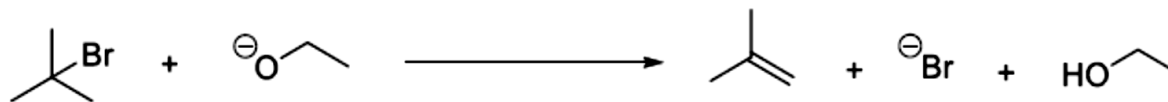


b) Indicate the asymmetric carbon atom and designate the R/S configuration to each of the following compounds. (6 marks)



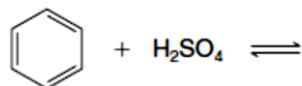
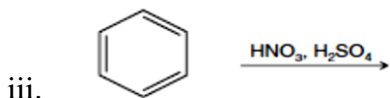
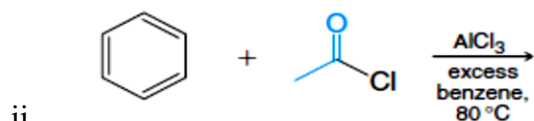
CHEM 231

- c) Differentiate between;
- (i) A chiral molecule and an achiral molecule (2 marks)
 - (ii) Enantiomer and diastereomer (2 marks)
- d) Consider the following E2 reaction



- (i) What is the rate equation for this reaction? (1 mark)
 - (ii) Using proper Lewis structures and curved arrow formalism, propose a mechanism for this process. (2 marks)
 - (iii) Draw an energy diagram. Label the axes, starting materials and products. Draw the structures of the transition states for the rate limiting step and identify the rate determining step. (3 marks)
- e) Briefly explain the following methods of synthesizing alcohols
- (i) Acid-catalyzed hydration of alkenes (3 marks)
 - (ii) Hydroboration oxidation (3 marks)
- f) Give the products of the following reactions (3 marks)

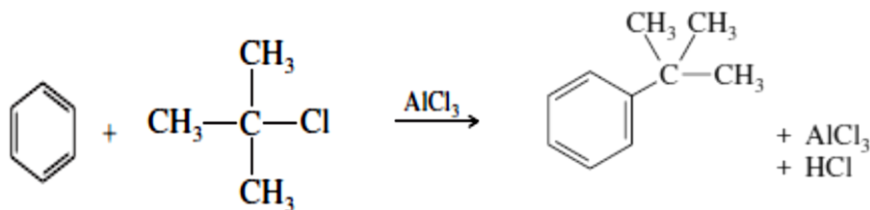
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QUESTION TWO (20 MARKS)

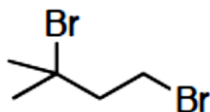
- a) Draw the structures of the following compounds (5 marks)
- i. 2-chloro-5-bromoheptane
 - ii. 2-ethoxyethanol
 - iii. Fluorobenzene
 - iv. *m*-Dinitrobenzene
 - v. 1,3-dibromobenzene

- b) Write the mechanism of the following reaction (7 marks)



- c) Distinguish between the factors that favor S_N1 and S_N2 reactions (4 marks)

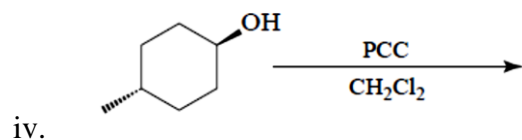
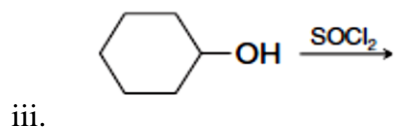
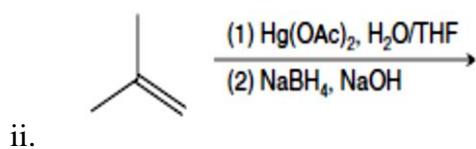
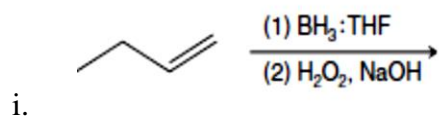
- d) For the following dibromo alkane indicate which position will react faster (is more reactive) under S_N1 and S_N2 conditions. Explain your answer. (4 marks)

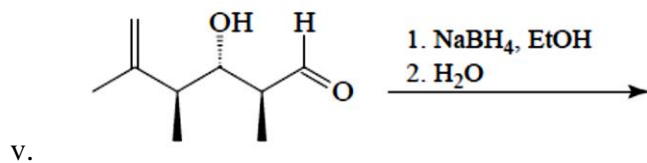


QUESTION THREE (20 MARKS)

- a) State two physical properties of alcohols (2 marks)

- b) Predict the major organic product from each of the following reactions (10 marks)





- c) Predict the major product in each of the following reactions and indicate if it came from an $\text{S}_{\text{N}}1$, $\text{S}_{\text{N}}2$, E_1 , or E_2 reaction. (8 marks)

