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**SECOND YEAR B.Sc. DEGREE EXAMINATION, MARCH/APRIL 2005**

Part III—Group X—Polymer Chemistry

Paper II—ORGANIC CHEMISTRY

Time : Three Hours

Maximum : 60 Marks

*Answers may be written either in English or in Malayalam.***Section A***Answer either (a) or (b) of each question and each question carries 2 marks.*

- (a) Arrange the following compounds in the increasing order of acidity.  
CF<sub>3</sub>COOH, CH<sub>3</sub>COOH, CCl<sub>3</sub>COOH, HCOOH.  
(b) Give the structure of a highly stable carbanion. Account for their stability.
- (a) What is meant by Buker-Nathan effect ? Give an example.  
(b) Write the structures of photochlorination products of methane.
- (a) Complete the equation given below :  
Benzene diazonium chloride + resorcinol  $\longrightarrow$  ?  
(b) *o*-Nitrophenol has lower boiling point and lower water solubility than *p*-isomer. Explain.
- (a) What are Freons ?  
(b) Give the structure of alizarin and saccharin.
- (a)  $\alpha$ -Glucopyranose is oxidised by HIO<sub>4</sub> more rapidly than the  $\beta$ -anomer at the 1,2-bond suggest a reason.  
(b) Glucose and Fructose give identical osazones. Explain.
- (a) What is saponification value of an oil ?  
(b) Explain the cleansing action of soap.
- (a) Explain the isoprene rule. What is meant by special isoprene rule ?  
(b) What is the primary condition for optical activity ?
- (a) Outline the method of preparation of diazomethane and mention the important properties.  
(b) How is nitrosobenzene prepared from nitrobenzene ?
- (a) Define the terms 'Cracking' and 'Octane number'.  
(b) How will you account for the colour change of phenolphthalein in acid and basic media ?
- (a) Give the structure of geraniol and cellulose.  
(b) Complete the following reaction.



(10 × 2 = 20 marks)

**Turn over**

## Section B

Answer either (a) or (b) of each question and each question carries 4 marks.

11. (a) Briefly describe  $E_1$  and  $E_2$  mechanisms with specific examples.  
 (b) Write the structure of product/products formed in the following reaction.
- (i) Chlorobenzaldehyde  $\xrightarrow{50\% \text{ NaOH}}$  ?
- (ii) Acetophenone  $\xrightarrow[\text{H}^+]{\text{LiAlH}_4}$  ?
- (iii) Acetophenone  $\xrightarrow[\text{base}]{\text{NH}_2 - \text{NH}_2}$  ?
- (iv) *m*-Nitrobenzaldehyde  $\xrightarrow{\text{CN}^-, \text{H}^+}$  ?
12. (a) Write notes on :  
 (i) Hofmann degradation.  
 (ii) Beckmann rearrangement.  
 (b) Provide M.O. representations of ethane and propyne.
13. (a) How will you distinguish between primary, secondary and tertiary amines ?  
 (b) What happens when quaternary ammonium compound is pyrolysed ? How will you separate tertiary amine from a primary amine ?
14. (a) Give a neat sketch of the proton NMR spectrum of ethyl alcohol. Indicate the chemical shift values ( $\delta$ ).  
 (b) Briefly explain the theory and application of IR spectroscopy.
15. (a) Write briefly on :  
 (i) Conformations of cyclohexane.  
 (ii) Oppenauer oxidation.  
 (b) Explain the principle and application of UV-visible spectroscopy.

(5 × 4 = 20 marks)

## Section C

Answer either (a) or (b) of each question and each question carries 10 marks.

16. (a) Briefly explain the different mechanisms of esterification and ester hydrolysis.  
 (b) How are proteins classified ? Briefly describe the different levels of structural organisation in proteins.
17. (a) Explain the general methods of isolation and properties of alkaloids. Write the structure of nicotine. What is Emole degradation ?  
 (b) Write short notes on the following :—  
 (i) Arndt Eistert synthesis.  
 (ii) Kolbe reaction and Kolbe synthesis.  
 (iii) E-Z Configuration of geometrical isomers.

(2 × 10 = 20 marks)