

2117

B.Sc. (H.S.) in Organic Chemistry III-Semester
ORGANIC CHEMISTRY OF FUNCTIONAL
GROUP—III

Paper—302

Time allowed—Three Hours] [Maximum Marks—75

Note :— Attempt **TEN** questions in A, **EIGHT** in B
and **TWO** in Section C respectively.

SECTION—A

1. (i) How will you distinguish between glucose and sucrose ?
- (ii) How α -amino acids are prepared ? Give two examples.
- (iii) How can you explain the fact that triethyl amine boils at lower temperature than dimethyl amine ?
- (iv) What is azo dye ?
- (v) How will you differentiate between terminal and internal alkynes by IR ?
- (vi) What is bathochromic shift ?
- (vii) What do you understand by Zwitter ion ?
- (viii) Glucose decolourises colour of bromine water while fructose does not explain.

(ix) What is strecker synthesis ?

(x) How diazopropane can be converted to n-propyl bromide ?

(xi) How will you define the term diastereoisomer ?
Give an example.

(xii) What is the frequency of absorption of $>C=O$ group in IR ? 1.5×10^4

SECTION—B

2. How will you synthesize alanine from ethyl chloride ?
3. Write down all the structures of tripeptide made up of glycine and alanine.
4. How will you synthesize 1,4-diaminobutane from ethylene ?
5. Discuss the cyclic structure of D-glucose.
6. (i) Explain why amines are more basic than amides.
(ii) Explain the term epimer and anomer.
7. Starting from glucose how will you prepare :
(i) Sorbitol
(ii) n-Hexane.
8. How will you differentiate between 1° , 2° and 3° amine by IR ?
9. What is a dye ? How are they classified on the basis of application ?

10. Carbonyl group of acetone shows a strong stretch at 1715 cm^{-1} while $>\text{C}=\text{O}$ group of benzaldehyde at 1690 cm^{-1} and ester at 1750 cm^{-1} . Explain.

11. Why the optical rotation of aq. solution of D-glucose changes with time and finally becomes constant ?

4.5×8

SECTION—C

12. Write short notes on :

(a) Hoffmann's degradation

(b) Gabriel Phthamide Synthesis

(c) Ruff Degradation.

4×3

13. An organic compound (A) $\text{C}_3\text{H}_6\text{O}_2$ when treated with excess of NH_3 and then heated, forms B ($\text{C}_3\text{H}_7\text{NO}$).

B on heating with P_2O_5 gives C ($\text{C}_3\text{H}_5\text{N}$). C on

hydrolysis gives compound A. Compound C on

reduction with LiAlH_4 gives compound D ($\text{C}_3\text{H}_9\text{N}$)

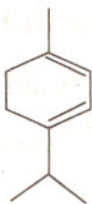
which on reaction with HNO_2 gives compound

E ($\text{C}_3\text{H}_8\text{O}$). E on oxidation gives compound A. Give

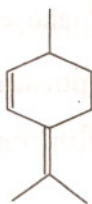
structure of A, B, C, D and E.

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14. (a) The following diene have experimental λ_{max} 243 and 265 nm in ethanol. Giving reasons, correlate the λ_{max} values to the structures (i) and (ii) :

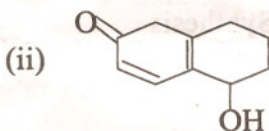


(i)



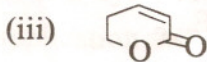
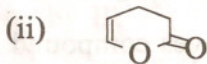
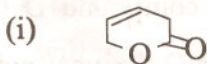
(ii)

- (b) What is the λ_{max} for



- (c) Explain why PhMe, Ph₂CH₂ and Ph₃CH have similar uv spectra ($\lambda_{\text{max}} \sim 262$ nm). 4×3

15. (a) Giving reasons arrange the followings in order of increasing wavelength of carbonyl absorption in their IR spectra :



(b) Deduce the structures of isomeric compounds (A) and (B) having molecular formula C_3H_6O and following IR spectral data :

(A) 1710 cm^{-1}

(B) $\sim 3300\text{ cm}^{-1}$, 1640 cm^{-1} .

(c) How will you distinguish the following pairs of compounds on the basis of IR spectroscopy :

(i) o- and p- hydroxy acetophenone

(ii) CH_3CH_2COCl and $ClCH_2COCH_3$. 4×3