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B.Sc. 4th Semester (New Scheme) Examination,  
May-2016

BIOTECHNOLOGY

Paper-BT-406

Organic Chemistry

23/28/77

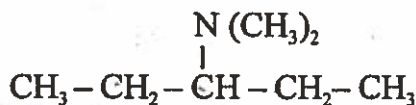
*Time allowed : 3 hours ]*

*[ Maximum marks : 40*

*Note : Attempt five questions in all, selecting one question from each section. Question No. 1 is compulsory.*

1. (i) Propene and propyne exhibit multiple bond stretching bands but ethene and ethyne do not. Explain why?

- (ii) Write the name of following in IUPAC system –

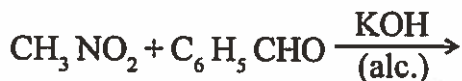


- (iii) Deduce the number of fundamental vibrations possible for  $\text{CH}_4$ .

- (iv) Explain why excess of mineral acid is added during diazotisation of aryl amine?

- (v) Draw molecular Orbital structure of carbonyl group? What type of orbitals does carbonyl carbon use?

- (vi) Complete the Reaction



- (vii) Which reagent is used for reduction of one nitro group of m-dinitrobenzene?

- (viii) What is Tollen's reagent?

1 × 8 = 8

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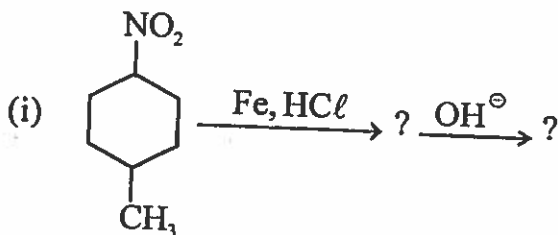
[P.T.O.]

## Section-I

2. (a) Discuss briefly the principle of IR spectroscopy ? 3  
 (b) What is Hook's Law ? 2  
 (c) How would the IR spectra of following pair of compounds differ ?  
 (i) Acetone and ethanol  
 (ii) Acetic acid and Methanol  
 (iii) Cyclohexanol and Cyclohexanone 3
3. (a) Write short note on Overtone ? 3  
 (b) How would you account for the observation that phenyl acetate absorbs at higher frequency than methyl benzoate ? 3  
 (c) Write the factors which determine the vibrational frequency ? 2

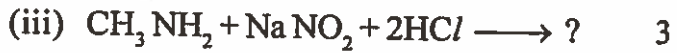
## Section-II

4. (a) Discuss briefly the structure of amines ? 2  
 (b) How can you separate mixture of amines by Hinsberg's method ? 3  
 (c) Complete the reactions :



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5. (a) Arrange the following compounds in each set in order of increasing basicity :

(i) Benzylamine, m-chlorobenzylamine, methyl benzylamine

(ii) Aniline, P-methoxy aniline, P-nitro aniline 3

(b) Discuss the mechanism of Gabriel phthalamide synthesis? 3

(c) Why amines have higher boiling points than hydrocarbons of comparable molecular masses? 2

### Section-III

6. (a) What is coupling reaction? Explain with mechanism? 3

(b) Explain the structure of benzene diazonium chloride? 2

(c) How will you bring about the following conversions :

(i) Nitrobenzene into m-nitrophenol

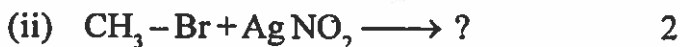
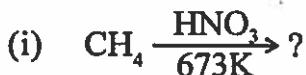
(ii) m-nitroaniline into m-chloriodobenzene. 3

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[P.T.O.]

7. (a) Complete the following reactions :



(b) Write short note on Tautomerism. 3

(c) Write short note on Nitration of Benzene. 3

#### Section-IV

8. (a) Discuss the mechanism of following reaction :

(i) Cannizaro Reaction

(ii) Mannich Reaction

(iii) Aldol condensation 6

(b) Why dipole moments of aldehydes and ketones are higher than those of alcohols ? 2

9. (a) Discuss briefly the advantages of oxidation of alcohols with :

(i) Sarett Reagent

(ii) Pyridinium Chlorochromate

(iii) Pyridinium dichromate 3

(b) Discuss the synthesis of aldehydes by

(i) Stephen's Reaction

(ii) Etard Reaction 3

(c) What is Haloform Reaction ? 2