(i) Printed Pages : 4 Roll No. .....

(ii) Questions : 9 Sub. Code : 0 4 9 1

Exam. Code : 0 1 0 3

B.A. /B.Sc. (General) 3rd Year

1046

CHEMISTRY

(Same for B.Sc. Microbiology & Food Technology)

Paper–X : Organic Chemistry

Time Allowed : Three Hours] **[Maximum Marks : 45**

Note :– Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **I** is compulsory. All questions carry equal marks.

I. (a) What is a nucleotide ?

(b) Give names of two acidic amino acids.

(c) How many D-aldoheptoses are possible ?

(d) Is pyridinium ion aromatic in nature ?

(e) Write the structure of ethylacetoacetate showing keto enol tautomerism.

(f) What is an essential condition for a molecule to show IR-spectra ?

(g) From what lactam is Nylon 6 synthesized ?

(h) Which carbon in Indole is most susceptible to electrophilic substitution ?

(i) What is mutarotation ? 9×1=9

UNIT–I

II. (a) Explain the following observations :

(i) Although saturated carboxylic acids absorb at about 1720 cm^{-1} (5.81 μm) in the infrared region, amino acids do not absorb at this position.

(ii) If a neutral solution of an amino acid is acidified, the infrared spectrum then shows absorption at 1720 cm^{-1}.

(b) How will you convert glucose into fructose and vice-versa ?

(c) Why D-Mannose and D-Glucose give same osazone ?

3,4,2

III. (a) Starting with monomeric amino acids, show the preparation of ala-gly and phe-val and also explain how these dipeptides can be joined to yield ala-gly-phe-val (Do not use a solid phase synthesis).

(b) Write a short note on Electrophoresis.

(c) Give the total number of bases present in DNA and RNA. How many of these are common to both kinds of nucleic acids ?

5,2,2

UNIT–II

IV. (a) How many different types of chemically equivalent protons are present in each of the following compounds.

(i) $CH_3 - CH = CH_2$

(ii) $CH_3 CH_2 - \overset{\overset{O}{\|}}{C} - OCH_2 CH_3$

(b) Calculate ratios of different kinds of protons in a compound with integral ratio of 6 : 4 : 18.4 (going from left to right across 'HNMR spectrum). Determine the structure of compound with molecular formula $C_7 H_{14} O_2$ that would give these relative integrals in the observed order in the spectrum.

4,5

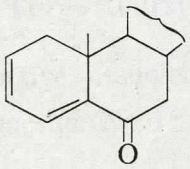
V. (a) How does 'HNMR spectrum help in determination of relative amounts of tautomers in case of acetylacetone ?

(b) Write down all the steps in free radical vinyl polymerization. What are the molecules which undergo this type of polymerization ?

(c) How does Nylon 66 differ from Nylon 6 and Nylon 610 ? Draw all the structures. 2,4,3

UNIT–III

VI. (a) On the basis of Woodward Fieser rules, Calculate λ_{max} for the following compound :



(b) Why the absorption spectra of molecules show broad bands whereas those of atoms show sharp spectral lines ?

(c) Explain the following in absorption spectroscopy by taking suitable examples :

(i) Hypsochromic shift

(ii) Bathochromic shift 3,2,4

VII. (a) In otherwise similar compounds which one of each of the following pairs of partial structures would show stronger infrared absorption :

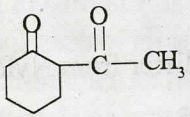
(i) C = O or C = C

(ii) C = C – Cl or C = C – H

(iii) O – H or N – H

(b) Suggest a reaction sequence leading to 3 - Phenylpropanoic acid.

(c) How would you prepare the following compound by an enamine synthesis ?



3,3,3

UNIT–IV

VIII. (a) What is the order of reactivity of Pyrrole, Furan and Thiophene towards aromatic electrophilic substitution ? Explain.

(b) How Furan is converted to

(i) Furfural
(ii) Succinaldehyde
(iii) 2 - Furoic acid
(iv) 2 - Acetylfuran ?

(c) In acidic conditions, Pyridine undergoes electrophilic substitution with great difficulty. Why ? 3,4,2

IX. (a) What quinoline is obtained from a Skraup synthesis using P-toluidine and Phenyl vinyl ketone ?

(b) Describe the following reactions by giving one example each :

(i) Fischer Indole Synthesis
(ii) Simmons - Smith Reaction
(iii) Reformatsky Reaction

Also given their mechanisms. 3,6