B.N.Bandodkar college of science

T.Y.B.Sc. Preliminary Examination , Feb.2012

Chemistry -III

Marks: 100 Duration: 3Hrs.

N.B: (1) All questions are compulsory.
(2) Figures to the right indicate full marks.
(3)Use of log tables / Non –programmable calculators is allowed.

1. (a) Explain Saytzeff rule with a suitable example. (3)

OR

(a) Write IUPAC names of the following. (3)

1. (b) Discuss the stereochemistry of Biphenyls. (3)

OR

(b) Explain the use of ultrasound in organic synthesis with suitable examples. (3)

(c) Give the number of signals and splitting pattern expected in PMR spectra of (3)
(i) (ii)

(d) How is alpha amino acid prepared by Erlenmeyer azalactone synthesis? (3)

(f) Explain multicomponent synthesis with a suitable example. (2)

(g) Write the structure and uses of
(1) Polyethylene (2) Polycarbonate (2)

OR

(g) Explain the mechanism of free radical addition polymerization. (2)

(h)What are alkaloids? Write the structure of nicotine. (2)

OR

(h) Explain the terms.
(1) Acid value (2) Saponification value (2)

2.(a) What is Beckmann rearrangement? Explain its mechanism with one application.(5)

OR

(a) What is Michael addition reaction? Explain its mechanism with one application. (5)

Attempt any three from the following.

(b) (i)Write the structural formula for each of the following compounds. (3)
1)1-amino-6-methoxy spiro [3.4] octane.
2)1-chloro-1, 2-pentadiene
3)1, 2 –Thiazole

(ii) Explain the use of Lindlar catalyst with a suitable example. (2)

(c) (i)Complete the following reactions. (3)

(ii) Explain the use of SeO_2 in oxidation of active methylene and methyl hydrogen atoms. (2)

d) (i)What is Lithium dialkylcuprate? Give one method of its preparation. Give its reaction with 1-iodopropane. (3)

(ii) Complete the following reactions. (2)

(e)(i) What is saponification? Discuss B_{AC}^2 mechanism. (3)

(ii) Explain the mechanism for the formation of acetals. (2)

3. (a) (i) Explain angle and eclipsing strain with one example each. (3)

(ii) Assign Z or E notation to the following. (2)

OR

(a) (i) Explain the stereochemistry of SN^2 reaction with a suitable example. (3)

(ii) Complete the following reaction and explain its mechanism. (2)

Attempt any three from the following.

(b) (i) Explain aromaticity of thiophene. (3)

(ii) Explain acid catalyzed polymerization of pyrrole. (2)

(c) Write the synthesis of the following compounds. (5)

(1) Vanillin (2) Norfloxacin

P.T.O.

(d) (i) complete the following reactions. (3)

(ii) Explain pyridine is stronger base than pyrrole. (2)

(e) Explain the following terms: (3)

(i) Topicity (ii) Diastereotopic faces.

(ii) Draw the boat conformation of cyclohexane and label carbon-hydrogen bonds. (2)

4. (a)Define : Auxochrome (5)

An organic compound has molecular formula $C_8H_8O_2$. Find the hydrogen deficiency index and assign the structure to the compound showing following spectral data.

IR (cm^{-1}) : 700 and 760, 1720,3500

NMR (ppm) : 3.5(2H,s), 7.2 (5H,m), 11.6(1H,s). D_2O exchangeable.

OR

(a)(i) Explain different types of electronic transitions possible in a molecule in UV-spectroscopy. (3)

(ii) Explain the choice of TMS as a standard for recording NMR spectra. (2)

Attempt any three of the following.

(b)(i) Define 'polymers'. Explain the following with one example each. (3)

(1) Copolymers (2) Homopolymer

(ii) Explain with example, the use of fillers in manufacture of polymers. ()

©(i) What are photochemical reactions?

Explain photochemical cleavage of hexane-2-one. (3)

(ii) Explain the terms 'singlet state' and 'triplet state' used in photochemistry. (2)

(d)(i) write the structure and use of (3)

(1) PHA (2) TPA

(ii)Diescribe the prepaation and use of polyamides. (2)

(e)(i)Explain the principle of mass spectroscopy. (3)

(ii) Describe various modes of vibrations in IR spectroscopy. (2)

P.T.O.

5.(a) (i)Convert the following open chain formula to Haworth pyranose(β-form) formula. (3)

(ii) Explain α-helical structure of protein. (2)

OR

(a) (i) Write analytical evidence to prove- (3)

1) Citral is α, β-unsaturated aldehyde.
2) Citral contains isopropylidine group.
3) Nicotine has a pyridine ring with a side chain containing N-CH_3 group.

(ii) Explain Hofmann exhaustive methylation and elimination with a suitable example.(2)

Attempt any three from the following.

(b) (i) Explain mutarotation of D(+) Glucose. (3)

(ii) How is D (+) glucose converted into D (-) Arabinose? (2)

(C) Explain the importance of Karrer's work in the determination of structures of nicotine. Write the synthesis of β-ionone from citral. (5)

(d) (i) Give the reaction of excess of phenyl hydrazine on glucose and fructose. (3)

(ii)Write the structures of – (2)

1) Sucrose 2) Maltose

(e)(i)Describe Merrifield solid phase synthesis for dipeptides. (3)

(ii) Explain the hydrolysis of nucleic acids. (2)