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SARDAR PATEL UNIVERSITY
B. Sc. (V Semester) Examination
9th May 2016 (Monday)
10.30 am – 1.30 pm
US05CCHE01 : ORGANIC CHEMISTRY

Total Marks : 70

Q. 1 Choose the correct option for the following: (10)

(1) Electrophilic substitution in pyridine takes place at
(a) Position – 2 (b) Position – 3 (c) Position – 4 (d) Position – 2 & 4

(2) Which of the following heterocyclic compound is not aromatic?
(a) Pyridine (b) Pyrrolidine (c) Furan (d) Thiophene

(3) How many NMR signals are possible for allyl alcohol?
(a) 3 (b) 4 (c) 5 (d) 6

(4) Which of the following alkyl benzene have smallest delta value for the ring protons (aromatic protons)?
(a) Toluene (b) p-Xylene (c) Mesitylene (d) p-tert.-butyl toluene

(5) Which of the following is the monomeric unit of neoprene?
(a) Terephthalic acid (b) 1, 3 – Butadiene (c) Cycloprene (d) Chloroprene

(6) In syndiotaćic polypropylene, methyl groups are arranging on ..... to an extended chain.
(a) alternating (b) one side (c) random (d) none of these

(7) Which of the following is the example of Co-polymer?
(a) SBR (b) PVC (c) Orlon (d) Plexiglas

(8) Which of the following compound is used as diluents in detergent?
(a) Sodium Silicate (b) CMC
(c) Sodium Carbonate (d) Sodium Tripolyphosphate

(9) Which of the following compound is bicyclic halogenated insecticide?
(a) BHC (b) Baygon (c) DDT (d) Heptachlor

(10) Which of the following is used as latest animal fixatives?
(a) Civet (b) Musk Zibata (c) Amergris (d) None of these

Q. 2 Answer the following: **(Any Ten)** (10)

(1) Explain Pyrrolidine is a stronger base than pyrrole.
(2) Give the synthesis of 1-Methyl isoquinoline from benzene by using Bischler-Napieralski synthesis.
(3) Give the synthesis of 3-Amino Pyridine from β-picoline.
(4) Why TMS has been used as a standard reference point in NMR Spectroscopy?
(5) Differentiate between enantiotopic protons and diastereotopic protons.
(6) Give various aspects of CMR Spectroscopy.
(7) What are dienes? Just classify the following dienes into appropriate class.
(a) 2, 4 – Hexadiene, (b) 1, 2 – Propadiene, (c) 1, 4 – Pentadiene.
(8) Explain the term Hyperconjugation in Propylene.
(9) Natural rubber is an elastomer whereas Gutta-percha is highly crystalline and non-elastic. Explain.
(10) Give the comparison of soap and detergent.
(11) Give the synthesis and applications of detergent containing Imidazoline class having heterocyclic moiety.
(12) Write the mode of application of stomach insecticide.

Q. 3 Give the detail step synthesis of 5, 6 – Benzoquinoline from 2 – Amino naphthalene by Skraup synthesis. Give the detail step synthesis of 3 – Carbethoxy – 2, 4, 5 – Trimethyl pyrrole from α - Amino Ketone and ethyl acetoacetate by using Knorr-pyrrole synthesis. (10)

OR

Q. 3 Explain pyridine is stronger base than pyrrole but weaker base than methyl amine. Why nucleophilic substitution reaction in pyrimine is preferred at position – 2 and position – 4 but not at position – 3? Give the detail step synthesis of Hygrinic acid from 1, 3 – dibromo propane and sodium salt of ethyl malonate using suitable reagent. (10)

Q. 4 Deduced the structure of compound having following spectral data. Label all kinds of a protons / carbons and give appropriate explanation for the structure.

(1) Molecular formula : $C_8 H_{10} O_2$. (04)

IR (cm^{-1}) : 3400, 3050, 2950, 1611, 1590, 1510, 1460, 1306, 1252, 1175, 1035, 820.

NMR (8, ppm) :
(a) 7.2, 4H, Quartet
(b) 4.4, 2H, Singlet
(c) 3.8, 3H, Singlet
(d) 3.6, 1H, Singlet

(2) Molecular formula : $C_7 H_9 N$. (03)

CMR (8, ppm) :
(a) 14.3, Quartet
(b) 28.2, Triplet
(c) 123.4, Doublet
(d) 149.8, Doublet
(e) 152.8, Singlet

(3) Molecular formula : $C_4 H_6 O_2$. (03)

CMR (8, ppm) :
(a) 22.3, Triplet
(b) 27.9, Triplet
(c) 68.9, Triplet
(d) 178.2, Singlet

OR

Q. 4 Answer the following:

(a) Write a note on phenomenon of splitting of NMR signals indicating clearly how the multiplicity of splitting reflects the number of protons adjacent to the absorbing protons. (03)

(b) How will you assign to configuration of geometric isomers by using CMR spectroscopy? Discuss in detail. (03)

(c) Deduced the structure of compound having following spectral data. Label all kinds of a protons / carbons and give appropriate explanation for the structure. (04)

(i) CMR (8, ppm) :
(a) 3.4, Quartet
(b) 50.8, Triplet
(c) 77.9, Singlet
(d) 61.6, Singlet

(ii) NMR (8, ppm) :
(a) 2.0, 3H, Singlet
(b) 1.8, 2H, Singlet
(c) 4.1, 1H, Singlet

Q. 5 Answer the following:

(1) Give the detail mechanism for polymerisation of styrene in presence of sodium metal and naphthalene. (03)

(2) What are plastics? Give their classification and discuss its properties. (03)

(3) Discuss the addition of HBr to 1, 3 – butadiene at low temperature (–80° C) and at high temperature (40° C) with potential energy diagram. (04)

OR

Q. 5 Answer the following:

(1) Write about the role of Ziegler-Natta catalyst in the synthesis of polymers. (04)

(2) Give the distinguishing features of addition and condensation polymerisation. (03)

(3) Discuss the addition of HCl to 2, 4 – hexadiene. (03)

Q. 6 Answer the following:

(1) Discuss the classification of detergent on the basis of ionisation into water. (03)

(2) Give the synthesis and applications of perfume use in electroplating. (03)

(3) Give the synthesis and applications of DDT from the cheapest raw material. Discuss its detail steps. (04)

OR

Q. 6 Answer the following:

(1) Give the advantages and disadvantages of organophosphorus insecticides. (04)

(2) Give the synthesis & application of detergent used as an indicator in alkali titration and Laxative in medicine from the cheapest raw materials. (03)

(3) Give the synthesis and application of Coumarin from the cheapest raw materials by both methods. (03)