DCJ-003-1016007 Seat No. _____

B. Sc. (Sem. VI) (CBCS) (W.E.F. 2016) Examination

July - 2022

Chemistry : C-602

(Organic Chemistry & Spectroscopy)

Faculty Code : 003
Subject Code : 1016007

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) Total five questions, all are compulsory.
(2) The figure to the right side indicates the marks of the sub-question.

1 (a) Give answer of following questions : **4**

(1) Write the structure of isoprene.

(2) Citral is an ..... monoterpene.

(3) Write structure of PETN

(4) Mixture of PETN and TNT is known as ..... (pentolites/ torpex)

(b) Give answer of following questions: (any one) **2**

(1) How can detected ..... $COCH_3$ group in terpennoids ?

(2) Give synthesis and use of musk keton.

(c) Give answer of following questions: (any one) **3**

(1) Explain about parathion with synthesis and their uses.

(2) Describe classification of terpenoids.

(d) Give answer of following questions: (any one) **5**

(1) Explain constitution of citral.

(2) Give synthesis and use of RDX.

2 (a) Give answer of following questions : **4**

(1) Amino acid reduced with LIALH4 gives ..... (B-amino alcohol/amine)

(2) Thyroxine contains .....element (iron/iodine)

(3) Define: amino acid.

(4) Glycine is chiral compound (true/ false)

(b) Give answer of following questions: (any one) **2**

(1) Clarify essential and non essential amino acids.

(2) Give method of preparation of alpha amino acid by hydantion method.

(c) Give answer of following questions: (any one) **3**

(1) Explain isoelectric point.

(2) Write any one synthesis of polypeptides.

(d) Give answer of following questions: (any one) **5**

(1) Explain constitution of thyroxine.

(2) What is polypeptide ? Give synthesis of thyroxine.

3 (a) Give answer of following questions: **4**

(1) ..... conformer of Ethane is most stable. (Staggered /Eclipsed)

(2) By continuous reduction of Napthalene in the presence of Ni/H2 to form.....

(3) All carbon atoms in napthalene are ..... (SP2/SP3)

(4) Define: Molecular ion peak.

(b) Give answer of following questions: (any one) **2**

(1) Explain Friedel-Craft alkylation and acylation of naphthalene.

(2) Explain any two uses of mass spectrometry.

(c) Give answer of following questions: (any one) **3**

(1) Describe conformational analysis of Ethane.

(2) Explain: hydrogen transfer rearrangement in mass spectrometry with example.

(d) Give answer of following questions: (any one) **5**

(1) Explain oxidation of reaction of naphthalene and anthracene.

(2) Discuss conformation of n-butane with energy diagram.

4 (a) Give answer of following questions: **4**

(1) Name any two solvents used for NMR spectroscopy.

(2) How many signals are obtained in NMR spectrum of acetone?

(3) Give number of signals for the compound $CH_2 \cdot Br–CH_2–C \cdot Br_2–CH_3$

(4) Define: Coupling constant (J)

(b) Give answer of following questions: (any one) **2**

(1) Give number of signals and splitting for the compound 1-chloroethene

(2) Explain any two applications of NMR spectroscopy.

(c) Give answer of following questions: (any one) **3**

(1) Why TMS is used as a reference standard in NMR spectroscopy?

(2) Explain: n+1 rule for multiplicity with examples.

(d) Give answer of following questions: (any one) **5**

(1) Explain any three factors affecting chemical shift in NMR spectroscopy.

(2) (i) Explain number of signals and splitting for following compound:
$Cl \cdot CH_2 \cdot CH(CH_3) \cdot CH_2COOH$

(ii) Assign the structure to a compound having following characteristics: M.F. $C_{11}H_{16}$
NMR : δ 1.05 SINGLET 9H, δ 2.3 SINGLET 3H, δ 7.2 COMPLEX 4H

5 (a) Give answer of following questions: **4**

(1) Give formula of DBE.

(2) Which information is obtained from IR spectra?

(3) How many NMR signals will be obtained for the compound p-Nitrophenol?

(4) Give structural formula for $C_5H_8Cl_{14}$ which can give only ONE NMR signal.

(b) Give answer of following questions: (any one) **2**

(1) Differentiate n-propyl benzene and isopropyl benzene using NMR spectra.

(2) Explain number of signals and splitting for following compound: $CH_3–0–CH_2CH_2COOCH_3$

(c) Give answer of following questions: (any one) **3**

(1) Assign the structure to a compound having following characteristics : $C_9H_{10}O_2$ δ 2.5 SINGLET 3H, δ 3.9 SINGLET 3H, δ 7.83 COMPLEX 4H

(2) Assign the structure to a compound having following characteristics: M.F. $C_5H_{10}O_2$ NMR (ppm): δ 10.3 SINGLET 1H, δ 1.1 SINGLET 9H

(d) Give answer of following questions: (any one) **5**

(1) Assign the structure to a compound having following characteristics: M.F. $C_9H_{12}O$
IR (cm^{-1}) : 3035, 2960, 2829, 1615, 1498, 1455, 1057, 1026, 743, 697
NMR (ppm): δ 1.88 QUINTET 2H, δ 2.56 TRIPLET 2H, δ 2.75 TRIPLET 2H, δ 3.5 SINGLET 1H, δ 7.15 SINGLET 5H

(2) Assign the structure to a compound having following characteristics : M.F. $C_{10}H_{13}Cl$
IR (cm^{-1}): 3040, 2950, 2850, 1600, 1570, 1490, 1425, 1365, 1010, 690, 740, 600
NMR (ppm): δ 1.5 SINGLET 6H, δ 3.07 SINGLET 2H, δ 7.1 COMPLEX 5H