F – 5441

Reg. No. : ....

Name : ....

Third Semester M.Sc. Degree Examination, February 2019
Branch : Polymer Chemistry
PC – 232 : ORGANIC CHEMISTRY – II
### (2014 Admission Onwards)

Time : 3 Hours

Max. Marks : 75

SECTION – A

Answer **any two** among **(a)**, **(b)** and **(c)** from **each** question. **Each** sub-question carries **2** marks.

1. a) Explain aromaticity and antiaromaticity in terms of molecular orbital energy levels.

   b) What is oxycope rearrangement ?

   c) Tropylium bromide behaves as an ionic compound. Account for this observation.

2. a) What are the products you expect to arise by the irradiation of

$$H_3C \diagdown \quad \diagup CH_2C_6H_5$$
$$C = C \quad ?$$
$$H \diagup \quad \diagdown H$$
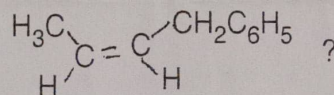
   b) What are the likely product(s) from the vapour phase irradiation of trans 2,6 – dimethyl cyclohexanone ?

   c) What is quantum efficiency or quantum yield ?

3. a) What is Thorpe reaction ?

   b) Explain Dieckmann condensation reaction with a suitable example.
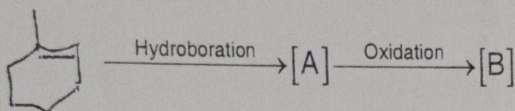
   c) What is Baeyer-Villiger oxidation ?

4. a) Calculate λ_{max} for the following :

i)

ii)
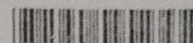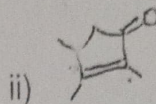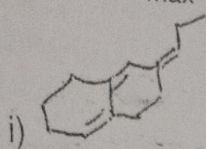
b) How would you distinguish between cis and trans isomers of 2-butenes by infrared analysis ?

c) Mass spectrum of CH_3Br shows two peaks of equal intensity at m/e of 94 and 96. Account for this observation.

5. a) Formulate the following :

 $\xrightarrow{\text{Hydroboration}}$ [A] $\xrightarrow{\text{Oxidation}}$ [B]

b) What is nucleoside ? Give an example.

c) Explain why RNA is easily cleaved and DNA is not.   (10×2=20 Marks)

SECTION – B

Answer either (a) or (b) from each question. Each sub-question carries 5 marks.

6. a) Write down the characteristic features of electrocyclic and cyclo addition reactions.

   b) Formulate the following and explain interms of yield
      1-methoxybutadiene + Acrolein → I + II.

7. a) Explain the following :
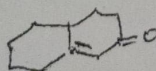   i) Norrish Type I reaction   ii) Dimerization reactions

   b) Write a note on the following :
      i) Photo-Fries rearrangement   ii) Photosynthesis.
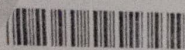
8. a) What is Robinson ring annulations ? How would you prepare the following compound ?

   b) Discuss the applications of :
      i) Stork examine reaction and   ii) Simon-Smith reaction.

9. a) Predict the structure of a compound (m.f : C_9H_{12}) with the following ^{1}H-NMR spectrum. δ 1.2 ppm (d, 6H), 2.8 ppm (heptet, 1H), 7.3 ppm (s, 5H). Explain the use of shift reagents in spectroscopy.

   b) Giving suitable examples, how would you distinguish 1°, 2° and 3° arrives on the basis of their mass spectral studies.

10. a) Write notes on reagents and protecting groups in synthesis.

    b) How would you determine C-Terminal and N-Terminal amino acids in a given peptide ?

    (5×5=25 Marks)

SECTION – C

Answer **any three** questions. **Each** question carries **10** marks.

11. With the help of symmetry properties of the molecular orbitals of cyclohexadiene, show that why its con-rotatory conversion to 1, 3, 5-hexatriene is a thermally forbidden.

12. Give a brief account on applications of photoreactions in laboratory and industrial synthesis.

13. Explain the following reactions with applications and outline the mechanism.

    i) Oppenauer oxidation

    ii) Birch reduction

14. Deduce the structure of the organic compound having analysis : C, 74.98% and H, 6.86%

    Mass analysis : 176, 131 (base peak), 103, 77

    IR : υ_{max} 1714 and 1639 cm^{-1}

    ^{1}H-NMR : δ 1.31 (t, 3H, J = 7.1 Hz) : 4.20 (q, 2H, J = 7.1 Hz)

    6.43 (d, 1H, J = 15.8 Hz) : 7.24 – 7.54 (m, 5H)

    7.67 (d, 1H, J = 15.8 Hz)

    ^{13}C-NMR : δ 14.3, 60.4, 118.4, 128.1, 128.9, 130.2, 134.5, 144.5, 166.8

    Interpret the spectral data.

15. Describe the applications of the following reagents in organic synthesis.

    i) DDN   ii) NBS   iii) DCC   (4+3+3=10)

    (3×10=30 Marks)

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