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**B—17—2019**

**FACULTY OF SCIENCE**

**B.Sc. (Third Year) (Sixth Semester) EXAMINATION**

**MARCH/APRIL, 2019**

**(CBCS Pattern)**

**CHEMISTRY**

**Paper-XIV-A<sub>1</sub>**

**(Organic and Inorganic Chemistry)**

**(Saturday, 16-3-2019)**

**Time : 10.00 a.m. to 12.00 noon**

*Time—2 Hours*

*Maximum Marks—40*

*N.B. :— (i) Attempt All questions.*

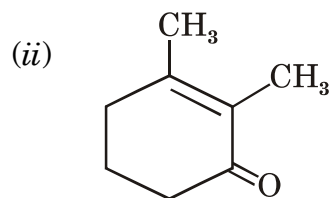
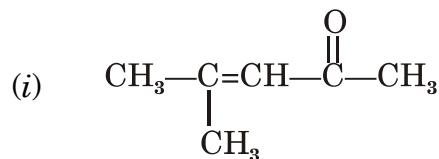
*(ii) Figures to the right indicate full marks.*

**Section A**

**(Organic Chemistry)**

1. Answer any *five* of the following : 5×2=10

- (a) State and explain Beer's law.
- (b) Explain hypochromic and hyperchromic effects.
- (c) Predict the number of PMR signals of :
- (i) Diethyl ether
- (ii) Acetone.
- (d) Calculate the  $\lambda_{\max}$  of :



P.T.O.

- (e) Explain magnetic and non-magnetic nuclei.
- (f) What are amino acids ? How are they classified ?
- (g) Explain the term Zwitter ion and isoelectric point.
2. Answer any *two* of the following : 2×5=10
- (a) Explain Photofries rearrangement with mechanism.
- (b) Explain use of Dicyclohexyl carbodiimide (DCC) as a reagent for peptide bond formation.
- (c) How will you interpret I.R. spectra of the following compounds :
- (i) Benzene
- (ii) Phenol
- (iii) Benzaldehyde.
3. Answer any *one* of the following : 1×7=7
- (a) Deduce the structure and name of the compound having molecular formula  $C_3H_5N$  and the following spectral data :
- UV : Transparent above  $\lambda_{max}$  210 nm
- IR :  $2980\text{ cm}^{-1}$ ,  $2250\text{ cm}^{-1}$
- PMR( $\delta_{ppm}$ ) :  $\delta_{1.1}(t, J = 6\text{ Hz}, 3H)$   
 $\delta_{3.5}(q, J = 7\text{ Hz}, 2H)$
- (b) (i) Discuss TMS as a reference and advantages of TMS.
- (ii) Deduce the structure of the compound based on the following PMR spectral data :
- Molecular formula :  $C_2H_6O$
- PMR( $\delta_{ppm}$ ) :  $\delta_{1.3}(t, 3H)$   
 $\delta_{3.5}(q, 2H)$   
 $\delta_{4.7}(s, 1H)$

**Section B**  
**(Inorganic Chemistry)**

4. Solve any *three* of the following : 3×3=9
- (a) What are postulates of valence bond theory of coordination compounds ?
  - (b) State Jahn Teller theorem in octahedral complexes.
  - (c) Calculate CFSE in tetrahedral complexes having  $d^8$ ,  $d^9$  and  $d^{10}$  configurations.
  - (d) Describe Orgel energy level diagram for  $d^1$  and  $d^9$  configuration.
  - (e) Discuss the types of electronic transitions.
5. Solve any *two* of the following : 2×2=4
- (a) What are the limitations of CFT ?
  - (b) Calculate the number of unpaired electrons in the following complexes :
    - (i)  $[\text{Fe}(\text{CN})_6]^{-3}$
    - (ii)  $[\text{Ni}(\text{CN})_6]^{-2}$ .
  - (c) What are distorted octahedral complexes ?
  - (d) Give an account of spectrochemical series.