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**V—16—2017**

**FACULTY OF SCIENCE**

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

**OCTOBER/NOVEMBER, 2017**

**CHEMISTRY**

Paper XIV (CH-303)

(Organic and Inorganic Chemistry)

**(Saturday, 7-10-2017)**

**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) Define the following terms :
- (i) Hypochromic effect and Blue shift.
- (ii) Auxochrome and its examples.
- (b) Calculate the  $\lambda_{\max}$  :
- (i) 1, 2-dimethylcyclohexadiene.
- (ii) But-3-en-2-one.
- (c) Give the general properties and importance of proteins.
- (d) What happens when :
- (i) Glycine treated with formaldehyde.
- (ii) Glycine reacts with acetyl chloride.
- (e) How will you synthesize dipeptide by  $\text{NH}_2$ -protecting group agent using carbobenzoxy chloride.

P.T.O.

- (f) What do you mean by shielding and deshielding of a proton ? Give its examples.
- (g) Predict the number of 'PMR' signals of :
- (i) Ethylamine
  - (ii) Diethyl ether.
2. Answer any *two* of the following : 2×5=10
- (a) What do you mean by functional group region ? How will you interpret 'IR' spectra of the following organic compounds :
- (i) Acetone
  - (ii) Benzoic acid
  - (iii) Acetaldehyde.
- (b) Draw  $\alpha$ -amino acid structure and explain dipolar nature of amino acid. How will you obtain ester from glycine ?
- (c) What is cationotropic rearrangement ? Explain Bayer-Villiger rearrangement with mechanism.
3. Answer any *one* of the following : 1×7=7
- (a) An organic compound with molecular formula 'C<sub>3</sub>H<sub>6</sub>O' gave the following data :
- UV : transparent  $\lambda_{\text{max}}$  295 nm
- IR : 2975, 2825 – 2715, 1725 and 1415 cm<sup>-1</sup>
- PMR ( $\delta_{\text{ppm}}$ ) :  $\delta$ 1.31 (*t* – 3H)
- :  $\delta$ 2.45 (*q* – 2H)
- :  $\delta$ 9.7 (*t* – 1H)
- Deduce the structure and name of organic compound.
- (b) What are addition polymerization ? Give *two* examples. Discuss the anionic polymerization reaction with mechanism. Give synthesis and importance of :
- (i) glyptal
  - (ii) polyurethanes.

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

4. Solve any *three* of the following : 3×3=9
- (a) Explain inner and outer orbital complexes with suitable example.
  - (b) Explain splitting of *d* orbital in tetragonal (elongated octahedral) complexes.
  - (c) Calculate CFSE in octahedral complexes having  $d^1$ ,  $d^2$  and  $d^3$  configuration.
  - (d) Describe electronic spectra of  $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$  complex ion.
  - (e) Describe Orgel energy level diagram for  $d^1$  and  $d^9$  configuration.
5. Solve any *two* of the following : 2×2=4
- (a) How size of *d* orbitals affect the magnitude of  $10 Dq$  ?
  - (b) State Jahn-Teller theorem.
  - (c) What are the limitations of crystal field theory ?
  - (d) What is LMCT ? Give their example.