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**AO—16—2018**

**FACULTY OF SCIENCE**

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

**MARCH/APRIL, 2018**

**CHEMISTRY**

**Paper XIV (CH-303)**

**(Organic and Inorganic Chemistry)**

**(Friday, 16-3-2018)**

**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) Calculate the  $\lambda_{\max}$  :

(i) 2, 4-dimethyl-1, 3-Pentadiene

(ii) But-2-enal.

(b) Define the terms :

(i) Wavelength and wavenumber

(ii) Chromophore and its examples.

(c) What are peptides ? How are they classified ?

(d) What happens when :

(i) Action of heat on glycine

(ii) Methyl iodide reacts with glycine.

(e) Explain equivalent and non-equivalent protons. Give its examples.

(f) Predict the number of PMR signal of :

(i) Acetone

(ii) Mesitylene.

P.T.O.

(g) Give the following colour test of proteins :

(i) Heller's test

(ii) Millon's test.

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

(a) What are molecular rearrangements ? Describe the pinacol-pinacolone rearrangement with mechanism.

(b) What are amino acids ? How will you prepare glycine from :

(i) Chloroacetic acid

(ii) Formaldehyde.

(c) What do you mean by fingerprint region ? How will you distinguish primary, secondary and tertiary alcohols using IR spectra ?

3. Answer any *one* of the following : 1×7=7

(a) What are homopolymers and heteropolymers ? Give *two* examples of each. Discuss the cationic addition polymerization reaction with mechanism. Give the synthesis and importance of :

(i) Neoprene

(ii) Bakelite.

(b) An organic compound with molecular formula 'C<sub>8</sub>H<sub>10</sub>' gave the following spectral data :

U.V. : Transparent above  $\lambda_{\max}$  200 nm

IR : 2925, 1620, 1550, 1415 cm<sup>-1</sup>.

PMR( $\delta$ ) ppm :  $\delta_{1,2}(t - 3H, J - 7.0 \text{ Hz})$

:  $\delta_{2,3}(q - 2H, J - 7.02 \text{ Hz})$

:  $\delta_{7,4}(s \text{ 5H}, J - 7.1 \text{ Hz})$

Deduce the structure and name of organic compound.

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

4. Solve any *three* of the following : 3×3=9
- (a) What are the postulates of crystal field theory ?
  - (b) Explain splitting of *d* orbitals in tetrahedral complexes.
  - (c) What are the limitations of valence bond theory ?
  - (d) Calculate the spectroscopic ground state term symbol of  $d^1$  configuration.
  - (e) Write a note on selection rule for *d* – *d* transition.
5. Solve any *two* of the following : 2×2=4
- (a) Explain the factors affecting the magnitude of  $10 Dq$  with respect to nature of ligand.
  - (b) Calculate the number of unpaired electron in the following complexes :
    - (i)  $[\text{Fe}(\text{CN})_6]^{-3}$
    - (ii)  $[\text{FeF}_6]^{-3}$ .
  - (c) Why have low spin complexes of tetrahedral geometry not yet been obtained ? Explain.
  - (d) Explain,  $[\text{Ti}(\text{H}_2\text{O})_6]^{+3}$  show purple colour.