This question paper contains **3** printed pages]

W—16—2018

FACULTY OF SCIENCE

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

OCTOBER/NOVEMBER, 2018

CHEMISTRY

Paper – XIV

(Organic and Inorganic Chemistry)

(Monday, 8-10-2018) **Time : 10.00 a.m. to 12.00 noon**

Time—Two 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*) What are peptides ? How are they classified ?

(*b*) How will you synthesize dipeptide by N-protecting group agent using tosyl chloride ?

(*c*) How will you prepare α-amino acids by Gabriel's synthesis ?

(*d*) Explain the terms :

(*i*) Equivalent and non-equivalent protons with examples.

(*ii*) Shielding and deshielding effect

(*e*) Define the terms :

(*i*) Chromophore and Auxochrome

(*ii*) Bathochromic shift and Hypsochromic shift.

(*f*) Predict the number of "PMR" signals of :

(*i*) Acetaldehyde,

(*ii*) Ethyl acetate.

P.T.O.

(*g*) Calculate the λ_{max} of :

(*i*) Cyclohex–2, 4-dienone

(*ii*) 2, 4, 6, Octatriene.

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

(*a*) What is cationotropic rearrangement ? Explain pinacol-pinacolone rearrangement with mechanism.

(*b*) What are fundamental vibrations of I.R. spectroscopy ? Give its examples.

(*c*) Explain in detail physical properties and importance of proteins.

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

(*a*) An organic compound with molecular formula "C_4H_8O" gave the following spectral data :

U. V. : Transparent λ_{max} 283 nm

I.R. : 2955, 2830 and 1715 cm^{-1}

P.M.R. : $\delta_{1.3}$ (t, 3H)

$\delta_{2.6}$ (q, 2H)

$\delta_{2.2}$ (s, 3H)

Deduce the structure and name of organic compound.

(*b*) What are addition polymerization ? Give its example. Explain cationic polymerization with mechanism. Give the synthesis and importance of :

(*i*) Polyurethane

(*ii*) Glyptal.

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*) Describe the splitting of *d* orbitals in tetrahedral complexes.

(*c*) Calculate CFSE in octahedral complexes having d^1, d^2 and d^3 electronic configuration.

(*d*) What is hole formulation ? Explain it with suitable example.

(*e*) Explain electronic spectra of $[Ti\ (H_2O)_6]^{+3}$ complex ion.

5. Solve any *two* of the following : 2×2=4

(*a*) Give an account of spectrochemical series.

(*b*) What are limitations of VBT of coordination compound ?

(*c*) Explain :

$$\Delta t = -\frac{4}{9}\Delta_0$$

(*d*) Write a note on LMCT.

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