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

GA—03—2023

FACULTY OF SCIENCE

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

APRIL/MAY, 2023

(CBCS/Old Pattern)

CHEMISTRY

Paper XIV(A)

(Organic and Inorganic Chemistry)

(Tuesday, 18-04-2023) **Time : 10.00 a.m. to 12.00 noon**

Time— Two Hours *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

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

1. Answer any *three* of the following : 3×5=15

(*a*) Write the postulate of valence bond theory.

(*b*) Define crystal field spliting. Calculate CFSE of d^1 and d^9. configuration in strong field octahedral complex.

(*c*) Explain the effect of nature of ligand, oxidation state of metal ion on magnitude of crystal field splitting.

(*d*) Write different types of electronic transition involved in metal complex.

(*e*) Write a note on spectrochemical series.

P.T.O.

2. Answer any *three* of the following : 3×5=15

(*a*) Interpret IR spectrum of the following compounds :

(*i*) Ethane

(*ii*) Ethene

(*iii*) Ethyne.

(*b*) Explain non-equivalent proton with example and predict number of PMR signal of :

(*i*) Ethyl amine

(*ii*) Ethyl benzene

(*iii*) di-ethyl ether

(*c*) Write the chemical reaction of α-amino acid due to $-NH_2$ group.

(*d*) The organic compound having molecular formula C_3H_8O shows the following spectral data :

UV : λ_{max} = 215 nm

IR : 3600 - 3200 cm^{-1}

2950 cm^{-1}

1100 cm^{-1}

PMR (δ ppm) :

δ 1.4, d, 6H

δ 3.5, septet, 1 H

δ 4.6, S, 1H

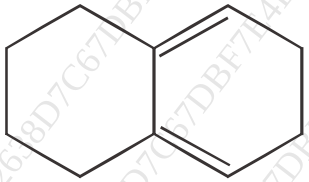
Deduce the structure of compound.

(*e*) Explain pinacol-pinacolone rearrangement reaction with mechanism.

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

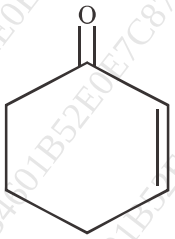
(*a*) Define chromophore and auxochrome. Calculate λ_{max} of :

(*i*)



(*ii*)

(*iii*)



(*b*) Give the synthesis of dipeptide by protecting –COOH group.

(*c*) Define chemical shift. Write the advantages of TMS.

(*d*) Deduce the structure of compound based on the following PMR spectral data :

Molecular formula : C_7H_8

PMR (d PPM) :

δ 2.7, S, 3H

δ 7.2 – 7.8, m, 5H