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SB—03—2022

FACULTY OF SCIENCE

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

JUNE/JULY, 2022

(CBCS/Old Pattern)

CHEMISTRY

Paper XIV

(Organic and Inorganic Chemistry)

(Thursday, 2-6-2022) **Time : 10.00 a.m. to 12.30 p.m.**

Time—2½ *Hours* *Maximum Marks*—40

N.B. :— (*i*) Attempt *All* questions.

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

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

(*a*) What are inner orbital complexes ? Explain with suitable example.

(*b*) Define crytstal field spliting ? Calculate CFSE for d^6, d^7, d^8 and d^{10} configurations of tetrahedral complex.

(*c*) Give the postulates of crystal field theory.

(*d*) Write the different types of electronic transitions.

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

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

(*a*) How will you interpret IR spectra of the following compounds :

(*i*) Ethyne

(*ii*) 1-propanol

(*iii*) phenol.

P.T.O.

(*b*) Define spin-spin splitting ? Predict the number of NMR signal of :

(*i*) Methanol

(*ii*) Diethyl ether

(*iii*) Acetone.

(*c*) How will you synthesise α-amino acid from strecker synthesis ? What is the action of $LiAlH_4$ on glycine ?

(*d*) Explain Favroskii rearrangement with mechanism.

(*e*) The organic compound having molecular formula C_3H_5N shows the following spectral data :

UV—Transparent above 210 nm

IR— 2975 cm^{-1}

2210 cm^{-1}

PMR (δ ppm) : δ 1.1, *t*, 3H

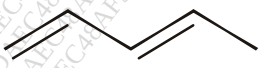
δ 3.5, *q*, 2H

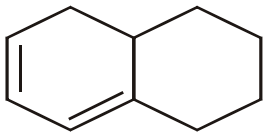
Deduce the structure and name of organic compound.

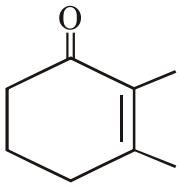
3. Answer any *two* of the following : 2×5=10

(*a*) Define chemical shift and give the advantages of tms ?

(*b*) Explain bathochromic and hypsochromic shift. Calculate λ_{max} of :

(*i*) 

(*ii*) 

(*iii*) 

(*c*) How will you synthesise peptide using DCC as reagent ?

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

Molecular formula : C_2H_5Br

PMR (δ ppm) : δ 1.5, *t*, 3H

δ 3.4, *q*, 2H