

#### Unit IV

No. of Printed Pages : 05

Roll No. ....

7. (a) Integrate the applications of NMR with its principle and detail instrumentation. 9  
(b) Summarize the selection rules for electronic spectroscopy. 6
8. (a) Integrate the applications of diffraction and scattering techniques to explain why they are important in surface characterization. 9  
(b) Conclude the applications of fluorescence in medical field. 6

#### (Compulsory Question)

9. (a) Explain the magnetic behavior shown by molecular O. 2  
(b) What is limitation of Crystal field theory ? 2  
(c) Name the intermediate formed in  $S_N1$  mechanism. 1  
(d) Explain Fischer Projection with a suitable example. 2

**18A10**

**B.Tech. EXAMINATION, 2022**

(First Semester)

(C-Scheme) (Main & Re-appear)

(Common for all Branches)

CH101C

CHEMISTRY

Time : 3 Hours]

[Maximum Marks : 75

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Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

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**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 9 is compulsory. All questions carry equal marks. Draw neat diagrams wherever applicable.

### Unit I

1. (a) What are the rules for linear combination of atomic orbitals ? 5  
(b) State the reason why Fe and Ni have similar atomic radii. 4  
(c) Draw the structure of  $\text{PCl}_5$ . 3  
(d) What is eigen function and eigen value ? 3
2. (a) Summarize the variations of ionic sizes and electron affinities across the periodic table. 5  
(b) Describe  $\text{NO}^+$  bond order and magnetic properties in comparison to NO. 10

### Unit II

3. (a) Illustrate isomerism in transition metal complex with example. 7  
(b) Classify the substitution reactions in different categories with suitable examples. 8

4. (a) Outline the electrophilic addition reaction with suitable example. 8  
(b) Demonstrate all the conformations of  $\text{C}_7\text{H}_{16}$ . 7

### Unit III

5. (a) Illustrate the term potential energy of a surface by taking a suitable example. 7  
(b) Give reason behind the higher boiling point of propanol as compared to Butane. 3  
(c) Explain, how cathodic protection of iron is different from its galvanization. 5
6. (a) Drive an expression to give the simultaneous effect of temperature and pressure on free energy change. 7  
(b) Show that entropy of mixing of ideal gases  $\Delta S_{\text{mix}} > 0$  5  
(c) Describe stress corrosion and discuss its types in brief detail. 3

- (e) Analyze the differences between absorption and emission spectroscopy. 2
- (f) Summarize the limitation of Beer's-Lambert's law. 2
- (g) Show the physical significance of free energy change. 2
- (h) How is standard free energy change related to the equilibrium constant ? 2

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