

B.Tech. 2nd Semester (G-Scheme)**(Common for All Branches) Examination, May-2023****CHEMISTRY - I****Paper - BSC-CH-101-G***Time allowed : 3 hours]**[Maximum marks : 75*

Note : Question no. 1 is compulsory and attempt four questions by selecting one from each Section.

1. (a) Is presence of chiral carbon, essential condition for a compound to be optically active? Explain giving a suitable example. 2.5
- (b) Give merits of Zeolite process. 2.5
- (c) How actual nuclear charge differs from effective nuclear charge? 2.5
- (d) State Aufbau and Pauli's exclusion principle for filling of electrons. 2.5
- (e) What is Tautomerism? Give an example. 2.5
- (f) Why tetramethylsilane (TMS) is chosen as reference for measuring Chemical shift in NMR spectroscopy? 2.5

 $6 \times 2.5 = 15$

Section-I

2. (a) With the help of M.O. diagram, explain the magnetic behavior, bond order and stability of NO molecule. 7
- (b) Discuss the Pi-molecular orbital diagram of butadiene. 4
- (c) Explain the role of doping in increasing the conduction in solids. 4
3. (a) Define ionisation energy. Explain the variation of I.E. along period and group. 7
- (b) What is polarisability? How it is helpful in explaining covalent character of a bond? 4
- (c) Write the mathematical expression for Schrodinger wave equation. Define Eigen function and Eigen value. 4

Section-II

4. (a) Differentiate the following: 8
- (i) Enantiomers and Diastereomers
- (ii) SN^1 and SN^2 reactions
- (b) What are Addition reactions? Classify them and explain the types. 7
5. Write a short note on the following: 15
- (i) Synthesis of Paracetamol
- (ii) Conformations of Butane
- (iii) Reduction of carbonyl compounds

Section-III

6. (a) What is corrosion? Explain all the factors that affect the phenomenon of corrosion. 12
- (b) Define critical volume, critical pressure and critical temperature. 3
7. (a) Explain the following terms: 8
- (i) Differential aeration corrosion
- (ii) Galvanic corrosion
- (b) Why $CaCO_3$ is used as standard to measure the hardness of water? Explain EDTA method to measure the hardness. 7

Section-IV

8. (a) Discuss the principles and applications of UV-Visible spectroscopy. 7
- (b) Explain the following terms: 8
- (i) Spin-spin coupling
- (ii) Equivalent and non-equivalent protons
9. Write short note on the following: 15
- (i) Flame photometry
- (ii) Shielding and Deshielding of protons
- (iii) Types of vibrations in IR spectroscopy