

Roll No.

Total Pages : 3

BT-1/D-18

31037

CHEMISTRY

Paper : BS-101A

(Time : Three Hours]

[Maximum Marks : 75

Note : Attempt any *five* questions, selecting at least *one* question from each unit. All questions carry equal marks.

UNIT-I

1. (a) Draw the molecular orbital energy level diagram for CO and N₂ molecules. Also find out the bond order in each case. 10
- (b) Define orbital and differentiate between σ and π molecular orbitals. 5
2. (a) What is crystal field stabilization energy. How is it calculated in tetrahedral, octahedral and square planar fields of ligands. 6
- (b) Write spectrochemical series and explain its importance. 3
- (c) What do you mean by aromaticity. Explain Huckel rule of aromaticity with examples. 6

UNIT-II

3. (a) What is absorption spectra ? Explain the following in respect of UV-visible spectroscopy.
- Bathochromic shift, Hyperchromic shift
Hypsochromic shift, Hypochromic shift. (2+8)
- (b) Explain stretching and bending vibrations with respect to IR spectroscopy. 5
4. (a) On what principle NMR spectroscopy is based ? What type of nuclei show NMR spectra. Explain. 5
- (b) Explain chemical shift, shielding and deshielding in NMR spectroscopy. 3
- (c) Write a short note on MRI. 4
- (d) What are selection rules in spectroscopy? 3

UNIT-III

5. (a) Explain the terms internal energy and enthalpy in thermodynamics. (2+2)
- (b) What is the physical significance of entropy? 3
- (c) Explain the term polarization, polarizability and polarising power. What is the significance of polarization? 5
- (d) Write a short note on hard and soft acids. 3
6. (a) Explain the following periodic properties in detail.
- (i) Ionization energy.
- (ii) Electro negativity. (5+5)

- (b) What is meant by effective nuclear charge. Write Slater rules for finding out effective nuclear charge. 5

UNIT-IV

7. What is isomerism ? Explain all.

- (a) The different types of structural isomers with example in each case. 10
- (b) What is drug ? How is aspirin synthesised ? What is the use of aspirin ? 5

8. Write short notes on the following :

- (a) Elimination reactions.
- (b) Enantiomerism.
- (c) CIP rules for writing absolute configuration. (5×3=15)