Roll No. .

Total Pages : 3

BT-I/D-19

31037

CHEMISTRY

Paper : BS-101-A

Time : Three Hours]

[Maximum Marks : 75

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

UNIT–I

1. (a) Write salient features of Molecular orbital theory. Draw the molecular orbital energy level diagram of O_2 molecule, and find its bond order. 8

   (b) Explain the bond structure of solids on the basis of molecular orbital theory and also explain the concept of doping. 7

2. (a) What do you mean by Crystal field splitting ? Explain the splitting in octahedral field. On the basis of crystal field splitting explain the structure of $[Co(NH_3)_6]^{3+}$. 10

   (b) Why conjugated butadiene is more stake than non-conjugated butadiene. 5

UNIT–II

3. (a) What is Molecular spectroscopy ? How does it differ from Atomic spectroscopy ? 3

   (b) Explain the concept of Fluorescence and how it differs from Phosphorescence. Give important applications of Fluorescence in Medicine. 6

   (c) Write a short note on Diffraction. 6

4. (a) What do you mean by Electromagnetic spectrum ? Give basic principle of Electronic spectroscopy and also explain Frank-Condon principle. 10

   (b) "IR spectra is often characterised as molecular finger-prints." Justify the statement. 5

UNIT–III

5. (a) Write down the important applications of Nernst equation and also derive Nernst equation. 6

   (b) Differentiate between Gibb's free energy and Helmholz free energy. whcih out of these two is called Work function, and why ? 4

   (c) Draw molecular geometries of H_2O, PCl_5 on the basis of Valence shell electron pair repulsion theory. 5

6. (a) What is Concept of Entropy ? Find out the expression for entropy change when volume and temperature are the two variables. 6

   (b) What do you mean by Electronic configuration of element ? Explain the three principles used while writing electronic configuration. 6

   (c) Write about Fajan rules. 3

UNIT–IV

7. (a) What are Structural isomers ? Write about position and chain isomers in detail giving examples. 6

   (b) Write a note on S_N1 and S_N2 reactions with examples. 6

   (c) Write Markownikof's rule with example. 3

8. (a) What are ring opening type of organic reactions ? Explain. 5

   (b) Write a short note on Diastereomers. 5

   (c) Write a method for the synthesis of Paracetamol. Where this drug is used ? 5