Exam.Code:0033
Sub. Code: 17961

2124

B.Sc. (Hons.) Biotechnology
First Semester
BIOT-104 T : Chemistry

Time allowed: 3 Hours **Max. Marks: 67**

NOTE: Attempt five questions in all, including Question No. 9 (Unit-V) which is compulsory and selecting one question each from Unit I -IV.

x-x-x

UNIT-I

1. (a) Draw molecular orbital energy level diagram of NO molecule with help of electronic configuration. Calculate its bond order and also tell its magnetic behaviour.
   (b) What are SLATER rules. Discuss properly. Calculate effective nuclear charge for one of the 3d electron of zinc atom. (6,7)

2. (a) Discuss Quantum theory of Raman Spectroscopy. Show how the Stokes and Anti Stokes lines appear in Raman spectrum of a molecule.
   (b) What is importance of mass spectroscopy in chemistry.
   (c) Differentiate between absorption and emission spectrum. (6,4,3)

UNIT-II

3. (a) What is depression in freezing point. Derive the relation between freezing point depression of solution and mole fraction of dissolved solute.
   (b) Discuss in detail about ideal and non-ideal solutions. (6,7)

4. (a) Discuss in detail the effect of temperature on rate of reaction.
   (b) Differentiate ORDER and MOLECULARITY.
   (c) What is meant by Activation energy. Discuss how it is determined with the help of Arrhenius equation. (4,4,5)

UNIT-III

5. (a) Discuss in detail about Phosphorescence and Fluorescence.
   (b) What is Stark-Einstein law of Photo Chemical equivalence. Describe it in detail. (8,5)

6. (a) Discuss optical isomerism in complexes having coordination number four and six with help of examples.
   (b) Write IUPAC names of the following.
   (i) $Li[Al(H)_4]$ (ii) $[Co(en)_2Cl_2]ClO_4$ (iii) $[Cr(NH_3)_6]^{3+}$ (iv) $K_2[Pt(Cl)_4]$
   (c) Define linkage isomerism with example. (8,4,1)

UNIT-IV

7. (a) Explain and compare SN^1 and SN^2 reactions with help of energy diagrams and mechanisms.
   (b) Write complete note on Resonance and Hyperconjugation. (8,5)

8. (a) Explain the following reactions with help of their mechanisms.
   (i) Esterification reaction
   (ii) HVZ reaction
   (b) Discuss and compare the reactivity of acid chlorides and amides with help of suitable examples. (8,5)

UNIT-V

9. Attempt the following.
   (a) What do you mean by Multicentre bond. Give example.
   (b) Explain zero point energy.
   (c) Differentiate Inductive and Electromeric effect.
   (d) Discuss in brief about carbenes.
   (e) Explain the term activity and activity coefficient.
   (f) Discuss Lambert Beer Law.
   (g) Why H_2O is liquid and H_2S is a gas.
   (h) Define Ionization isomerism with example. (2,2,2,2,2,2,2,1)

x-x-x