

(i) Printed Pages: 3

Roll No. ....

(ii) Questions : 9

Sub. Code : 

0	9	6	1
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Exam. Code : 

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B.Sc. (Hons.) Biotechnology 1<sup>st</sup> Semester  
(2122)

CHEMISTRY

Paper : BIOT-104-T

Time Allowed : Three Hours]

[Maximum Marks : 67

Note :—Attempt five questions in all including Question No. 9 (Unit V) which is compulsory and selecting one question each from Units I–IV.

UNIT-I

- Discuss SLATER Rules properly. Calculate effective nuclear charge for one of the 4s electron of Zinc atom.
  - Draw molecular orbital energy level diagram of NO molecule. Calculate its bond order with help of electronic configuration and also tell magnetic behaviour. 7+6
- What are advantages of Raman Spectroscopy over IR Spectroscopy ?
  - Write about principle of NMR.
  - Differentiate between absorption and emission spectrum.

5+4+4

## UNIT-II

3. (a) Derive Van't Hoff equation for osmotic pressure of a dilute solution. How this equation is useful in determining molar mass of a solute.
- (b) Discuss in detail ideal and non-ideal solutions. 6+7
4. (a) What is meant by Activation Energy ? Discuss how it is determined with the help of Arrhenius equation.
- (b) Derive expression for rate constant for first order reaction.
- (c) Differentiate ORDER and MOLECULARITY. 5+4+4

## UNIT-III

5. (a) What is Quantum Yield of Photo Chemical reaction ? Explain with example.
- (b) Discuss in detail about Phosphorescence and Fluorescence. 5+8
6. (a) Write IUPAC names of the following :
- (i)  $K_2[HgI_4]$
- (ii)  $[Co(en)_2Br_2]Cl$
- (iii)  $Li[Al(H)_4]$
- (iv)  $[Cr(NH_3)_6]^{3+}$ .
- (b) Explain Geometrical Isomerism in complexes having coordination number four and six with help of examples.
- (c) Define linkage isomerism with example. 4+8+1

#### UNIT-IV

7. (a) Explain and compare in detail  $SN^1$  and  $SN^2$  reactions with help of energy diagrams and mechanisms.
- (b) What are Carbenes ? Discuss its various types with examples. 8+5
8. (a) Discuss the following reactions with help of mechanisms :
- (i) HVZ reaction.
- (ii) Esterification reaction.
- (b) What is effect of substitution on acidic strength of carboxylic acids ? Explain with help of examples. 8+5

#### UNIT-V

9. Attempt the following :
- (a) What is Hyperconjugation ? 2
- (b) Explain Zero point energy. 2
- (c) Out of Na and  $Na^+$  which is smaller in size and why ? 2
- (d) Discuss successive ionization energies. 2
- (e) Explain the term activity and activity coefficient. 2
- (f) Discuss inductive effect with example. 2
- (g) Define Hydrogen bonding with examples. 2
- (h) What is Lambert-Beer Law ? 1