KUMARAGURU college of technology
character is life

Register Number: ……..

B.TECH DEGREE EXAMINATIONS: MAY 2015

(Regulation 2009)

Fourth Semester

BIOTECHNOLOGY

BTY108: Bio Organic Chemistry

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. With respect to galactose, glucose is a
   a) a stereoisomer
   b) a structural isomer
   c) not an isomer
   d) unrelated except that they are both sugars.
2. Tautomers are
   a) chiral molecule
   b) enantiomers
   c) structural isomers
   d) epimers
3. Electrophilic catalysis is a
   a) Covalent catalysis
   b) Non-caovalent catalysis
   c) Ionic catalysis
   d) Entrapment
4. Ribomuclease contains
   a) 118 amino acids
   b) 110 amino acids
   c) 124 amino acids
   d) 121 amino acids
5. What type of macromolecule carries out catalysis in biological systems?
   a) proteins called enzymes
   b) carbohydrates called starches
   c) nucleic acids called DNA
   d) lipids called steroids
6. Shape of Chevron plot in rate constant
   a) sigmoidal
   b) V shape
   c) Linear
   d) S shape curve

7. Formation of β Hairpin by joining of
   a) both hydrophobic chain
   b) one hydrophobic and hydrophilic
   c) Both hydrophilic side chain
   d) Two alpha helix
8. Precursor of chymotrypsin is
   a) trypsinogen
   b) chymotrypsinogen
   c) protrypsin
   d) trypsin
9. GroEL is
   a) Transporter protein
   b) Inhibitor
   c) allosteric protein
   d) Storage protein
10. Molecular chaperones
   a) are found in the nucleus and aid in folding of DNA
   b) degrade proteins that have folded incorrectly
   c) help new proteins fold correctly and repair incorrectly folded proteins
   d) are only present in cells that are exposed to high temperatures

PART B (10 x 2 = 20 Marks)

11. Define Henderson- Hasselbalch equation.
12. Differentiate optical and geometrical isomerism.
13. Write the applications of Hammond's postulate effects in reaction kinetics.
14. State the first law of thermodynamics.
15. Differences between the stereochemistry of enzymatic and non-enzymatic reactions.
16. Mention the application of combinatorial chemistry.
17. Give two examples for NAD dependent redox reactions.
18. Write down the equation of protection factor in 1H/2H-exchange method?
19. What is protein misfolding?
20. How do you explain the molecular model of iron transport in human system?

PART C (5 x 14 = 70 Marks)

21. a) (i) Differentiate the types of stereoisomerism with examples (7)
   (ii) Elucidate mechanism of SN1 and SN2. (7)

(OR)

b) Describe the mechanism and reaction behavior of following reactions with example

(i) E1 (7)

(ii) E2 (7)

22. a) Narrate the different classes of enzyme with an example for each class along with their function.

(OR)

b) (i) Define Gibbs Free energy and hence Derive the Relationship between Equilibrium Constant and Gibbs free energy and hence Calculate ΔG^{o} for conversion of oxygen to ozone $3/2\ O_2\ (g) \longrightarrow O_3\ (g)$ at 300 K, if K_p for this conversion is 9.4710^{-29}. (10)

(ii) Write down the significant of activation energy in reaction kinetics (4)

23. a) (i) Narrate the steps in DNA chemical synthesis (8)

(ii) Describe the of asymmetric synthesis of alpha amino acids. (6)

(OR)

b) (i) Illustrate the strategies involved in the designing of novel drug compounds of neuropeptides in clinical chemistry. (10)

(ii) Write in details about the design of enzyme molecules from steroid complex (4)

24. a) With neat sketch diagram explain the following enzymatic reaction mechanism

(i) Stereochemistry of fumarase catalysed reaction (4)

(ii) Stereochemistry of nucleophilic reactions (4)

(iii) NAD^+ and $NADP^+$ dependent oxidation and reduction (6)

(OR)

b) Elucidate the mechanism and structure involved in the hen egg white lysozyme system.

25. a) (i) Elaborate the mechanism of $^{1}H/^{2}H$-exchange methods in protein folding. (10)

(ii) Differentiate between the Φ-va!ue analysis with quenched-flow $^{1}H/^{2}H$-exchange (4)

(OR)

b) (i) Folding of barnase- Explain in detail using multistate kinetics. (10)

(ii) Deduce the role of molecular chaperones in protein folding. (4)

****