Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Sc.(H)(Genetics/BT/Mol.Bio/Micro.Bio)/SEM-1/MSA-101/2011-12

2011

MACROMOLECULAR STRUCTURE AND ANALYSIS

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

i) Which of the following is a non-reducing sugar ?

a) Trehalose b) Maltose

c) Lactose d) Cellobiose.

ii) The non-protein part of a holoenzyme is

a) Apoenzyme b) Coenzyme

c) Isoenzyme d) None of these.

iii) The amino acid found in protein structure is

a) Alanine b) Proline

c) Leucine d) Serine.

iv) Which of the following is an ether lipid ?

a) Sphingomylin b) Tripalmitin

c) Plasmalogen d) Lecithin.

v) Galactose and Glucose are

a) Anomer b) Epimer

c) Tautomer d) Functional isomers.

vi) Which of the following is an unsaturated fatty acid ?

a) Palmitic acid b) Arachidonic acid

c) Stearic acid d) Myristic acid.

vii) The chemical(s) which break(s) hydrogen bonding is/are

a) urea b) beta marcapto ethanol

c) SDS d) all of these.

viii) In beta turn hydrogen bonding is between i^{th} residue and

a) i + 2nd residue b) i + 1st residue

c) i + 3rd residue d) i + nth residue.

ix) The amino acids in proteins are linked by

a) hydrogen bond b) peptide bond

c) sulphide bond d) none of these.

x) Reaction between aldose or ketose and phenyl hydrazine is discovered by

a) Amadori b) Weygand

c) Fischer d) Shemyakin.

xi) What kind of mutation is occurring here ?

original word : The fat cat ate the wee rat

mutation : The fat tar eew eht eta tac

a) Deletion b) Insertion

c) Inversion d) Point mutation.

xii) In a Lineweaver-Burke plot a non-competitive inhibitor will have ..... point on the *x*-axis.

a) same b) different

c) any d) none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. a) What are introns and exons ?

   b) Given the following sequence for one strand of a double stranded oligonucleotide :

   $5'$ ACCGTAACTTTAG $3'$

   i) Write the sequence for complementary DNA strand.

   ii) Write the sequence of RNA complementary to the above mentioned stand. $2 + (1\frac{1}{2} + 1\frac{1}{2})$

3. a) Write down the chemical names of Purine bases found in nucleic acid.

   b) The two strands of DNA are anti-parallel. Explain with proper diagram. $2 + 3$

4. Discuss the structure of alpha helix.

5. Discuss epimerisation.

6. Write short notes on site specific recombination.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) What are polypeptides ?

   b) What do you mean by denaturation of protein ?

   c) Give diagrammatic representation of parallel and antiparallel β-sheets in a polypeptide chain.

   d) How can you determine the amino acid sequence in a polypeptide using Edman's or Sanger's reagent.

   e) Discuss about the types of bond that provide stability to the protein structure.

   f) What is pronase ? 1 + 2 + 4 + 3 + 4 + 1

8. a) Give the reaction of glucose with

      i) Phenyl hydrazine

      ii) Nitric acid

      iii) Bromine water.

b) Differentiate between :

i) anomer and epimer

ii) amylose and amylopectin.

c) Write down the structures of α-D glucopyranose and α-D fructopyranose.

d) What is the position of anomeric carbon in ribose ?

e) What is invert sugar ? Why is it called so ?

(2 + 1 + 1) + (2 + 2) + 3 + 1 + (1 + 2)

9. a) What are enzymes ? Classify enzymes with examples.

b) Give an account of influence of concentration of substrate on enzyme activity.

c) Give one example from each of the following classes :

i) Sulphur containing amino acid

ii) Phospholipids

iii) Homo polysaccharide. (1 + 6) + 5 + (1 + 1 + 1)

10. a) What are point mutations ?

    b) How does reverse mutation occur ?

    c) How does insertion cause mutation ?

    d) What are lethal mutation, nonsense mutation, silent mutation ? 3 + 3 + 3 + (2 + 2 + 2)

11. What was Griffith's experiment ? Describe the experiment of Avery, McLeod and McCarty. What was their conclusion ? How exact nature of the transforming principle was verified in the experiment of Hershey and Chase ? 5 + 4 + 1 + 5