Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Sc.(H)/BT/GE/MICRO.BIO/MOL.BIO
/SEM-1/MSA-101/2012-13

2012

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 :

$10 \times 1 = 10$

i) The single code abbreviation *D* is for

a) methionine b) aspartic acid

c) glumatic acid d) glutamine.

ii) Amphipathic β-pleated sheet contains

a) polar residues b) non-polar residues

c) both (a) and (b) d) none of these.

iii) Which of the chemical mutagens is likely to cause frameshift mutations ?

a) 5-bromo uracil b) 2-amino purine

c) EtBr d) HNO_2.

iv) Carbohydrates are

a) polyhydroxy aldehydes or ketones

b) polyhydroxy amines

c) polyhydroxy monocarboxylic acids

d) monohydroxy aldehydes or ketones.

v) The sugar found in RNA is

a) glucose b) deoxyribose

c) fructose d) ribose.

vi) The most abundant carbohydrate found in nature is

a) starch b) glycogen

c) cellulose d) chitin.

vii) Glucuronic acid contains

a) – COOH & CHO group

b) – COOH & CH_2OH group

c) – CHO & CH_2OH group

d) – COOH & COOH group.

viii) Mutarotation refers to change in

a) pH b) optical rotation

c) conductance d) chemical properties.

ix) Sickel-cell disease is the result of a single nucleotide substitution that produces a single amino acid substitution. This is best described as a

a) frame shift mutation b) nonsense mutation

c) splice-site mutation d) missence mutation.

x) Mutations can be considered as one of the raw materials of evolution because they

a) contribute a new variations in organism

b) are usually related to the environment in which they appear

c) are usually beneficial to the organism in which they appear

d) usually cause species of organisms to become extinct.

xi) A DNA mutation that results in number change in protein product is termed as

a) missense mutation b) nonsense mutation

c) silent mutation d) frameshift mutation.

xii) What is added to the 3′ end of many eukaryotic *m*RNA after transcription ?

a) Introns

b) Poly (*A*) tail

c) A cap structure consisting of *G* nucleotide

d) The trinucleotide 5′ CCA.

xiii) The transcribing enzyme is

a) DNA ligase

b) RNA polymerase

c) DNA polymerase

d) aminoacyl *t*RNA synthesis.

xiv) Which of the following is an example of the degeneracy of the genetic code ?

a) A given amino acid which has more than one codon

b) Each codon specifies more than one amino acid

c) The first two bases specify the amino acid

d) The genetic code is not degenerate.

GROUP – B

(Short Answer Type Questions)

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

2. Write the difference between *A, B* & *Z* forms of DNA.

3. Why is genetic code universal ? Give the exception of it. Describe the wobble hypothesis. 1½ + 1½ + 2

4. Discuss the differences between prokaryotic and eukaryotic translation.

5. How can D-glucose be converted to D-fructose ?

6. What are lipoproteins ? Write a short note on chilomicron.

1½ + 3½

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Write the differences between fibrous protein and globulin protein.

   b) What do you mean by secondary structure of protein ?

   c) What are the differences between parallel and anti-parallel β-sheets ?

d) Why is hydrophobic interaction the major contribution to the stability of protein structure ?

e) Draw a typical DNA structure (only schematic) and show the following : (i) Nucleotides, (ii) Phosphodiester bond (iii) Hydrogen bond. 3 + 3 + 3 + 3 + 3

8. a) Describe the function of an enzyme in enzymatic reactions.

b) Discuss different factors affecting the activity of enzymes.

c) What is the action site of an enzyme ? Define specific activity of an enzyme. 5 + 5 + (3 + 2)

9. a) Write short notes on :

i) Messelson and Stahl experiment

ii) Amino acid charging during translation.

b) Describe the role of *r*RNA in translation. (5 + 5) + 5

10. a) What are reducing and non-reducing sugars ? How do you convert aldohexose to aldopentose ? What happens when glucose is subjected to react with alkaline solution of iodine ?

b) Describe the functions of DNA mismatch repair system.

(4 + 4 + 3)+ 4

11. a) Describe the role of SSB-proteins in DNA replication. Explain why RNA primer is required in DNA replication.

b) Compare between somatic and germinal mutation. What is amorphic mutation ? (5 + 5) + (3 + 2)

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