



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 × 1 = 10

- i) The single code abbreviation *D* is for
- | | |
|------------------|------------------|
| a) methionine | b) aspartic acid |
| c) glutamic 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

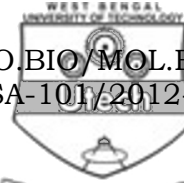
- a) glucose b) deoxyribose
c) fructose d) ribose.

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) Sickle-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) missense 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 *mRNA* after transcription ?

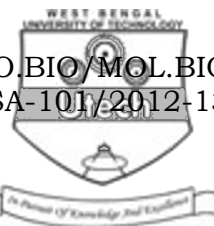
- a) Introns
- b) Poly (A) tail
- c) A cap structure consisting of G nucleotide
- d) The trinucleotide 5' CCA.

xiii) The transcribing enzyme is

- a) DNA ligase
- b) RNA polymerase
- c) DNA polymerase
- d) aminoacyl *tRNA* 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. $1\frac{1}{2} + 1\frac{1}{2} + 2$
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 chylomicron.

$1\frac{1}{2} + 3\frac{1}{2}$

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 ?

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/SEM-1/MSA-101/2012-13



- 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 rRNA 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.

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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