

This question paper contains 4 printed pages.]

Your Roll No.

1446

A

B.Sc. (Hons.)/I

MICROBIOLOGY—Paper II

(Biochemistry and Instrumentation)

(Admissions of 2004 and onwards)

Time : 3 Hours

Maximum Marks : 60

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

*Attempt five questions in all, selecting
at least two questions from each Section.*

*Attempt Section A and Section B on separate
answer books. All questions carry equal marks.*

SECTION-A

1. (a) Name the following :

- (i) Optically inactive sugar
- (ii) Most basic amino acid
- (iii) An essential fatty acid
- (iv) Non-standard amino acid
- (v) An unusual nitrogenous base present in *t*-RNA
- (vi) Reagent used for determination of N-terminal of a polypeptide.

1 × 6 = 6

[P.T.O.]

(b) Draw structure of (any *two*) :

- (i) Hyaluronate
- (ii) Cholesterol
- (iii) Sphingomyelin
- (iv) GTP

$3 \times 2 = 6$

2. Differentiate between (any *four*) :

- (i) Secondary and Tertiary structure of Protein
- (ii) Homo and Hetero polysaccharides
- (iii) Coenzymes and Cofactors
- (iv) Saponifiable and Non-saponifiable lipids
- (v) Isozymes and Multienzyme complex. $3 \times 4 = 12$

3. (a) What is steady state approximation? Under what conditions is it valid? 3

(b) Which of the following lowers the T_m of duplex DNA and how? 3

(c) Which of the following releases more energy on its breakdown and why? Phosphoenol pyruvate or Acetyl CoA. 3

(d) What is the ratio of proton donor to proton acceptor at pH 4, 5 and 6 for an acid with pK of 6? 3

4. (a) What are β -Benzymes? How are they produced? 3

(b) RNA is hydrolyzed with alkali treatment while DNA is not. Why? 3

(c) Why do phospholipids predominate cell membranes? 3

- (d) Which is more stable and why—A right handed or a left handed α -helix of polyglycine? 3

SECTION-B

1. (a) How are the mitochondria organized to be the power houses of the cell? 3
- (b) How would you determine the molecular weight of a protein by electrophoresis? 2
- (c) Differentiate between the following pairs :
- (i) Prokaryotic and eukaryotic ribosomes
- (ii) Primary and secondary lysosomes $2 \times 2 = 4$
- (d) Define the following terms in context of gel filtration :
- (i) Exclusion limit
- (ii) Bed volume
- (iii) Void volume $1 \times 3 = 3$
2. (a) State the principle of spectrophotometry. What are the applications of this technique. $2 + 2 = 4$
- (b) Define the following terms giving suitable examples or uses, which is applicable :
- (i) Fluor
- (ii) Microsomes
- (iii) Liposomes
- (iv) Cation exchanger $1\frac{1}{2} \times 4 = 6$
- (c) Chloroplasts exhibit a certain degree of functional anatomy. Comment. 2

3. (a) Discuss any *two* of the following in relation to cell membrane :

- (i) Asymmetric distribution of proteins
- (ii) Mobility of membrane proteins
- (iii) Effect of sterols on fluidity of membrane.

$$1\frac{1}{2} \times 2 = 3$$

(b) Where in the cell are the following enzymes localized? Mention the specific site within the organelle :

- (i) Succinic acid dehydrogenase
- (ii) Acid phosphatase
- (iii) Rubisco
- (iv) Adenylate kinase
- (v) Glycosyl transferase
- (vi) Peptidyl transferase

$$\frac{1}{2} \times 6 = 3$$

(c) Write in brief the principle and applications of any *two* of the following techniques :

- (i) Isoelectric focussing
- (ii) Affinity chromatography
- (iii) X-ray crystallography

$$2 \times 3 = 6$$