

BIOLOGY FOR ENGINEERS
(BIOT 4223)

Time Allotted : 2½ hrs

Full Marks : 60

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 4 (four) from Group B to E, taking one from each group.*

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

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) Nucleic acid synthesis takes place in
 - (a) 3'-5' direction
 - (b) 5'-3' direction
 - (c) Any direction
 - (d) Both direction
- (ii) Which of the following bases is absent in RNA
 - (a) Thymine
 - (b) Adenine
 - (c) Guanine
 - (d) Cytosine
- (iii) An exception to Mendel's Law is
 - (a) Purity of gametes
 - (b) Dominance
 - (c) Independent assortment
 - (d) Linkage
- (iv) Anabolism and Catabolism are different from each other in that
 - (a) Anabolism involves formation of biomolecules and catabolism involves breakdown of biomolecules
 - (b) Anabolism involves breakdown of biomolecules and catabolism involves formation of biomolecules
 - (c) None of the above
 - (d) All of the above
- (v) Glucose polymerises to form
 - (a) Starch
 - (b) Glycogen
 - (c) Cellulose
 - (d) All of these
- (vi) Restriction enzymes capable of making internal cuts in DNA molecule are called
 - (a) Restriction endonuclease
 - (b) Restriction exonuclease
 - (c) S1 nuclease
 - (d) All of these
- (vii) Enzymes present in intestinal juice is
 - (a) Pepsin
 - (b) Renin
 - (c) Trypsin
 - (d) Sucrase

- (viii) Which of the following is produced with the combination of apoenzyme and coenzyme?
 (a) Holoenzyme (b) Enzyme-substrate complex
 (c) Prosthetic group (d) Enzyme-product complex
- (ix) The greatest biodiversity on earth can be found in
 (a) African grasslands (b) Amazonian rain forest
 (c) Western Ghats (d) Nile Delta
- (x) Which of these is a suitable ex-situ conservation method?
 (a) National Park (b) Wildlife Sanctuary
 (c) Sacred graves (d) Seed Bank

Fill in the blanks with the correct word

- (xi) PUFA is a/an _____ fatty acid.
- (xii) Lactose is found in _____.
- (xiii) The cell organelle where ATP is produced is _____.
- (xiv) The enzyme which hydrolyses starch to maltose is _____.
- (xv) If the physical change accompanying the reaction is heat output, the biosensors are referred to as _____ biosensors.

Group - B

2. (a) What are the postulates of modern cell theory? [[C01](Remember/LOCQ)]
 (b) Discuss the structure of Nucleus of a cell. [[C01](Understand/IOCQ)]
 (c) Differentiate between cell wall and cell membrane. [[C02](Analyse/HOCQ)]
4 + 4 + 4 = 12
3. (a) Explain the significance of mitosis and meiosis. [[C04](Apply/IOCQ)]
 (b) What are the steps involved in transcription? [[C04](Understand/LOCQ)]
 (c) Elaborate how RNA synthesis initiates. [[C02](Apply/IOCQ)]
4 + 4 + 4 = 12

Group - C

4. (a) What is peptide bond? Define isoelectric point. [[C03](Analyse/HOCQ)]
 (b) What are essential amino acids? Give example. [[C03] (Remember/LOCQ)]
 (c) Name the monomers of the following:
 Sucrose, Lactose and Maltose [[C03](Apply/IOCQ)]
4 + 4 + 4 = 12
5. (a) Differentiate between Nucleotide and Nucleoside. [[C03](Analyse/IOCQ)]
 (b) What are the different phases of cell cycle? What happens inside cell during those phases? [[C04](Remember/LOCQ)]

- (c) Draw the general structure of an amino acid. Give examples of a basic and one acidic amino acid.

[[C03](Apply/HOCQ)]

$$3 + (2 + 3) + (2 + 2) = 12$$

Group - D

6. (a) Evaluate the applications of enzymes in different industrial sectors. [[C05](Evaluate/HOCQ)]
 (b) Discuss the three main steps of an enzyme catalysed reaction. [[C05](Analyze/IOCQ)]
 (c) Give an overview of classification of enzymes according to International Enzyme Commission. [[C05](Remember/LOCQ)]

$$4 + 4 + 4 = 12$$
7. (a) Analyse the concept of restriction modification system. [[C05] (Analyze/IOCQ)]
 (b) Show with a diagram the formation of Blunt ends and Sticky ends. [[C05](Illustrate/IOCQ)]
 (c) Give a brief outline of the commercial importance of restriction enzymes. [[C05](Understand/LOCQ)]

$$4 + 4 + 4 = 12$$

Group - E

8. (a) What do you mean by Richness and evenness of biodiversity? [[C06](Remember/LOCQ)]
 (b) Examine the commercial, economic and social benefits of biodiversity. [[C06](Examine/HOCQ)]
 (c) Analyze the potential threats towards biodiversity conservation. [[C06] (Analyze/IOCQ)]

$$4 + 4 + 4 = 12$$
9. (a) Discuss the basic concepts of environmental biosafety. [[C06] (Understand/LOCQ)]
 (b) Differentiate between richness and evenness of biodiversity. [[C06] (Differentiate/IOCQ)]
 (c) Comment on the ethical usage of stem cells in healthcare research. [[C05](Analyze/IOCQ)]

$$4 + 4 + 4 = 12$$

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	34.37	44.79	20.84

