

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) What is a cell?
(a) smallest and advanced unit of life (b) smallest and basic unit of life
(c) largest and basic unit of life (d) None of the above
- (ii) Which of the following bases is absent in RNA
(a) Thymine (b) Adenine
(c) Guanine (d) Cytosine
- (iii) DNA is made up of
(a) Ribose sugar and nitrogenous bases
(b) Deoxy-ribose sugar and nitrogenous bases
(c) Ribose sugar, nitrogenous bases and phosphates
(d) Deoxy-ribose sugar, nitrogenous bases and phosphates
- (iv) One example of polysaccharide is
(a) Glucose (b) Sucrose (c) Lactose (d) Starch
- (v) Which of the following is responsible for specifying 3D shape of protein?
(a) The peptide bond (b) The amino acid sequence
(c) Interaction with other polypeptides (d) None of the above
- (vi) Cellulose is
(a) A polymer of Sucrose (b) A polymer of Lactose
(c) A polymer of Fructose (d) A polymer of Glucose
- (vii) An enzyme that joins the ends of two strands of nucleic acid is
(a) Polymerase (b) Ligase
(c) Synthetase (d) Helicase
- (viii) The most important cause of loss of biodiversity today is
(a) habitat loss and fragmentation (b) over-exploitation
(c) alien species invasion (d) co-extinction

- (ix) Place where the threatened animals and plants are protected for special care is known as
 (a) In situ Conservation (b) Ex-situ Conversation
 (c) Wildlife Sanctuary (d) National Park
- (x) Global warming can be controlled by
 (a) Increasing solid waste (b) Reducing water wastage
 (c) Burning human-generated waste (d) Reducing fossil fuel consumption

Fill in the blanks with the correct word

- (xi) One example of hexose sugar is _____.
- (xii) Meiosis takes place in _____ cells.
- (xiii) Phospholipid is present in _____.
- (xiv) Cell wall is mainly made up of _____.
- (xv) _____ is an enzyme required in Dairy industry.

Group - B

2. (a) What are the postulates of modern cell theory? [[CO1](Remember/LOCQ)]
 (b) Discuss the structure of Nucleus of a cell. [[CO1](Understand/IOCQ)]
 (c) Differentiate between cell wall and cell membrane. [[CO2](Analyse/HOCQ)]
4 + 4 + 4 = 12
3. (a) Why mitochondria is called the power house of cell? [[CO1](Understand/LOCQ)]
 (b) How is DNA different from RNA? [[CO4](Apply/IOCQ)]
 (c) Discuss steps of replication of DNA using a suitable diagram. [[CO4](Apply/IOCQ)]
4 + 4 + 4 = 12

Group - C

4. (a) Classify the lipids in terms of structure and function. [[CO3](Apply/IOCQ)]
 (b) What are stem cells? Describe the three unique properties of stem cells. [[CO2](Remember/LOCQ)]
 (c) Distinguish between anabolism and catabolism with suitable example. [[CO2](Understand/HOCQ)]
4 + 4 + 4 = 12
5. (a) Decipher the four different structures of proteins. [[CO3](Evaluate/HOCQ)]
 (b) Classify lipids based on structure and function. [[CO3](Apply/IOCQ)]
 (c) What is the difference between saturated and unsaturated fatty acids? Give an example of each. [[CO3](Remember/LOCQ)]
4 + 4 + 4 = 12

Group - D

6. (a) What do you mean by palindrome sequence? Explain with an example. [[C05](Remember/LOCQ)]
 (b) Illustrate the formation of blunt ends and sticky ends. [[C05](Understand/LOCQ)]
 (c) Analyze the applications of restriction enzymes in healthcare and forensics. [[C05](Analyze/IOCQ)]
4 + 4 + 4 = 12
7. (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

Group - E

8. (a) Distinguish between ex-situ and in-situ conservation methods. [[C06](Differentiate/IOCQ)]
 (b) Comment on the advantages and disadvantages of Bioremediation. [[C06](Remember/LOCQ)]
 (c) Discuss about recent advances in engineering designs inspired by examples in biology. [[C06](Apply/HOCQ)]
4 + 4 + 4 = 12
9. (a) Discuss on the concept of Biosafety and Biohazard. [[C06](Analyze/IOCQ)]
 (b) Write a note on Biodiversity hotspot with an example. [[C06](Understand/LOCQ)]
 (c) What do you mean by 'in-situ conservation' and 'ex-situ conservation'? [[C06](Remember/LOCQ)]
(2 + 2) + 4 + (2 + 2) = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	41.66	37.50	20.84

