

**BIOLOGY**  
**(BIOT 2105)**

**Time Allotted : 3 hrs**

**Full Marks : 70**

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.*

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

**Group - A**  
**(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) New cell generate from  
(a) Bacterial fermentation (b) Regeneration of old cell  
(c) Pre-existing cell (d) Cell mutation
- (ii) Cellulose is a polymer of  
(a) Starch (b) Glucose (c) Lactose (d) Fatty acid
- (iii) Chromosome contains  
(a) DNA (b) RNA (c) Protein (d) Fatty acid
- (iv) DNA replication happens in  
(a) G<sub>0</sub> phase (b) M phase (c) S phase (d) None of these
- (v) The second step of central dogma is  
(a) Transcription (b) Translation  
(c) Reverse transcription (d) Protein degradation
- (vi) Which of the following is produced with the combination of Apoenzyme and Coenzyme?  
(a) Holoenzyme (b) Enzyme-substrate complex  
(c) Prosthetic group (d) Product
- (vii) Name the enzyme which catalyzes the oxidation-reduction reaction.  
(a) Transaminase (b) Glutamine synthetase  
(c) Phosphofructokinase (d) Oxidoreductase
- (viii) Biodiversity is of importance as it offers  
(a) Stability of ecosystems (b) Stability of atmosphere  
(c) Stability of species (d) Stability of research

- (ix) \_\_\_\_\_ is a biodiversity hotspot in India.  
(a) Gangetic plain (b) Sunderbans  
(c) Eastern Ghats (d) Western Ghats
- (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.

### **Group- B**

2. (a) Differentiate between Prokaryotic and Eukaryotic cells with one example of each type. [(CO1) (Differentiate/IOCQ)]  
(b) What are the basic structural features of cell membrane? Why it is called semi permeable? [(CO1) (Analyze/IOCQ)]  
(c) Describe the function of ribosomes in cell? [(CO2) (Understand/LOCQ)]  
**4 + (3 + 1) + 4 = 12**
3. (a) Differentiate between  
(i) DNA and RNA  
(ii) Plant cell and Animal cell. [(CO2) (Differentiate/IOCQ)]  
(b) What is genetic code? Why it is triplet? [(CO2) (Understand/LOCQ)]  
**(3 + 3) + (3 + 3) = 12**

### **Group - C**

4. (a) What are carbohydrates? Classify them with one example of each type. [(CO3) (Remember/IOCQ)]  
(b) Distinguish between: Starch and Cellulose. Despite being very similar in structure, why human cannot digest cellulose? [(CO3)(Differentiate/Analyze/IOCQ)]  
**(2 + 4) + (4 + 2) = 12**
5. (a) What are the two types of cell division? Name the different phases. [(CO4)(Remember/LOCQ)]  
(b) What is triglyceride? Mention their functions. [(CO4)(Understand/LOCQ)]  
**(3 + 3) + (3 + 3) = 12**

### **Group - D**

6. (a) Evaluate how co-factors help in the enzyme action. [(CO5) (Evaluate/HOCQ)]  
(b) Discuss the action of apoenzymes and holoenzymes in enzyme activity. [(CO5) (Analyze/IOCQ)]  
(c) What are intracellular and extracellular enzymes? Give one example of each. [(CO5)(Remember/LOCQ)]  
**4 + 4 + (2 + 2) = 12**

7. (a) Give a comparative analysis between Type-I, Type-II and Type-III restriction enzymes. [(CO5) (Compare/IOCQ)]  
(b) Evaluate the principle of nomenclature of restriction enzymes with the example of *EcoRI*. [(CO5) (Evaluate/HOCQ)]  
(c) Comment on the applications of restriction enzymes in research and development. [(CO5)(Analyze/IOCQ)]

**4 + 4 + 4 = 12**

**Group - E**

8. (a) What do you mean by Richness and evenness of biodiversity? [(CO6) (Remember/LOCQ)]  
(b) Differentiate between alpha, beta and gamma biodiversity. [(CO6) (Differentiate/IOCQ)]  
(c) Examine the importance of biodiversity hotspots. [(CO6)(Examine/HOCQ)]  
(d) Distinguish between ex-situ and in-situ conservation methods. [(CO6)(Analyze/IOCQ)]

**4 + 4 + 2 + 2 = 12**

9. (a) Illustrate with a diagram the working principle of a typical biosensor. [(CO6) (Illustrate/IOCQ)]  
(b) Write short notes on **any two**:  
(i) Piezo-electric biosensor  
(ii) Thermostatic/calorimetric biosensor  
(iii) Optical biosensor. [(CO6) (Understand/LOCQ)]  
(c) Comment on the applications of biosensors in different sectors. [(CO6)(Understand/LOCQ)]

**4 + 6 + 2 = 12**

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Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	45.9%	43.7%	10.4%

**Course Outcome (CO):**

After completion of the course, the students will be able to:

1. Understand the basic structure and function of cells and cellular organelles.
2. Understand the fundamental concepts of DNA, RNA and central dogma of cells.
3. Characterize the different types of proteins, lipids and carbohydrates.
4. Analyze the mechanism of inheritance of characters through generations.
5. Understand and implement the working principles of enzymes and their applications in biological systems and industry.
6. Design and evaluate different environmental engineering projects with respect to background knowledge about bioresources, biosafety and bioremediation.

**B.TECH/CHE/CE/EE/ME /3<sup>RD</sup> SEM/BIOT 2105/2021**

\*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question;  
HOCQ: Higher Order Cognitive Question

<b>Department &amp; Section</b>	<b>Submission Link</b>
<b>CHE</b>	<a href="https://classroom.google.com/c/NDE1MTAyMDc2OTI5/a/NDc0NjQ3OTM2OTU1/details">https://classroom.google.com/c/NDE1MTAyMDc2OTI5/a/NDc0NjQ3OTM2OTU1/details</a>
<b>CE</b>	<a href="https://classroom.google.com/c/NDI4NzEzOTc3MjU2/a/NDc0NjQ2NTU0NDYy/details">https://classroom.google.com/c/NDI4NzEzOTc3MjU2/a/NDc0NjQ2NTU0NDYy/details</a>
<b>EE</b>	<a href="https://classroom.google.com/c/NDUwMTQ1ODQzMkz/a/NDc0NjQ4NDY5NDky/details">https://classroom.google.com/c/NDUwMTQ1ODQzMkz/a/NDc0NjQ4NDY5NDky/details</a>
<b>ME - A</b>	<a href="https://classroom.google.com/c/NDA5ODgxOTU4Njkw/a/NDc0ODI0MTY0Mjkz/details">https://classroom.google.com/c/NDA5ODgxOTU4Njkw/a/NDc0ODI0MTY0Mjkz/details</a>
<b>ME - B</b>	<a href="https://classroom.google.com/c/NDA1OTg0Mzg2NDUw/a/NDc0ODI0MTY0NTYx/details">https://classroom.google.com/c/NDA1OTg0Mzg2NDUw/a/NDc0ODI0MTY0NTYx/details</a>