

USN

Course Code 2 2 B B 3 1 / 4 1

Third / Fourth Semester B.E. Degree Examinations, June/July 2025

## BIOLOGY FOR ENGINEERS

Duration: 3 hrs

Max. Marks: 100

**Note:** 1. Answer any FIVE full questions choosing ONE full Question from each Module  
 2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO:PI)</u>
<b><u>Module-1</u></b>			
1.	a. Explain the applications of stem cells.	08	(2 : 1 : 1.2.1)
	b. Describe the structure and functions of plant cell.	06	(2 : 1 : 1.2.1)
	c. Define cell and its characteristics. Write a note on cell theory.	06	(2 : 1 : 1.2.1)
(OR)			
2.	a. Describe prokaryotic cell structure with a neat labelled diagram and its mode of reproduction.	08	(2 : 1 : 1.2.1)
	b. Explain the functions and properties of carbohydrates biomolecule.	06	(2 : 1 : 1.2.1)
	c. Explain the functions of vitamins in human body.	06	(2 : 1 : 1.2.1)
<b><u>Module-2</u></b>			
3.	a. Explain the constructions of cellulose based water filters and its properties.	08	(2 : 2 : 1.2.1)
	b. Explain the working of vaccines and importance of DNA vaccines.	06	(2 : 2 : 1.2.1)
	c. Explain the properties and applications of bioplastics – PLA.	06	(2 : 2 : 1.2.1)
(OR)			
4.	a. Explain the 4 major functions of proteins along with their examples.	08	(2 : 2 : 1.2.1)
	b. Explain the lignolytic enzymes in bio-bleaching and their advantages.	06	(2 : 2 : 1.2.1)
	c. Explain the advantages and disadvantages of lipids as a cleaning agents/detergents.	06	(2 : 2 : 1.2.1)
<b><u>Module-3</u></b>			
5.	a. Define EEG, application of EEG and EEG signals.	08	(2 : 3 : 1.2.1)
	b. Give the comparison between brain and CPU.	06	(2 : 3 : 1.2.1)
	c. Explain the mechanism of filtration – urine formation with a neat labelled diagram.	06	(2 : 3 : 1.2.1)
(OR)			

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|----|----|--|----|----------------|
| 6. | a. | What is pacemaker? Explain the construction and types of it. | 08 | (2 :3 : 1.2.1) |
|    | b. | Write a note on optical corrections.                         | 06 | (2 :3 : 1.2.1) |
|    | c. | Explain the concept of abnormal lung physiology.             | 06 | (2 :3 : 1.2.1) |

#### **Module-4**

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|----|----|--|----|----------------|
| 7. | a. | Explain the working principles of ultrasonography with a diagram and state its uses. | 08 | (2 :3 : 1.2.1) |
|    | b. | Explain the light independent reaction of photosynthesis.                            | 06 | (2 :3 : 1.2.1) |
|    | c. | Explain the advantages and disadvantages of HBOCs.                                   | 06 | (2 :3 : 1.2.1) |

**(OR)**

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|----|----|--|----|----------------|
| 8. | a. | Explain the working principle of bionic leaf.          | 08 | (2 :3 : 1.2.1) |
|    | b. | Explain the importance of GPS technology in aircrafts. | 06 | (2 :3 : 1.2.1) |
|    | c. | Discuss about the physics behind the kingfishers beak. | 06 | (2 :3 : 1.2.1) |

#### **Module-5**

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|----|----|---|----|----------------|
| 9. | a. | Explain the different types of bio printing techniques.                                       | 08 | (2 :4 : 1.2.1) |
|    | b. | Compare and analyse the important image techniques used in bio-imaging for disease diagnosis. | 06 | (2 :4 : 1.2.1) |
|    | c. | Explain the advantages and disadvantages of DNA origami.                                      | 06 | (2 :4 : 1.2.1) |

**(OR)**

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|-----|----|--|----|----------------|
| 10. | a. | Explain the technology behind electric nose.                       | 08 | (2 :4 : 1.2.1) |
|     | b. | Explain the methods used for the separation or removal of metals.  | 06 | (2 :4 : 1.2.1) |
|     | c. | Explain the technological importance of self-healing bio-concrete. | 06 | (2 :4 : 1.2.1) |

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