CBCS SCHEME

USN

21BT752

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Biosensors and Applications

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define Biosensors. List various types with examples. (10 Marks)
b. Discuss the role of whole-cell biosensors in environmental monitoring. (10 Marks)

OR

2 a. Explain the principle of piezo-electric biosensors and their applications. (10 Marks)
b. Evaluate the advantages and disadvantages of immune- biosensors in clinical diagnostics. (10 Marks)

Module-2

3 a. Define Aptamers. List their types and roles in biosensing. (10 Marks)
b. Describe the working of ELISA and its relevance in disease detection. (10 Marks)

OR

4 a. Explain how enzymes are used in catalytic biosensors with suitable examples. (10 Marks)
b. Analyze the impact of nano-materials on enhancing biosensor sensitivity. (10 Marks)

Module-3

5 a. Define Enzyme Kinetics. Mention factors affecting it in biosensor performance. (10 Marks)
b. Explain how detection limit and selectivity are optimized in biosensor design. (10 Marks)

OR

6 a. Describe Biomolecule immobilization techniques with examples. (10 Marks)
b. Evaluate the role of calibration and operating conditions in ensuring biosensor accuracy. (10 Marks)

Module-4

7 a. Define Amperometry. How it is applied in biosensor development. (10 Marks)
b. Discuss the Principle and application of fluroscence spectroscopy in biosensors. (10 Marks)

OR

8 a. Explain the role of electron transfer at the electrode surface in biosensors. (10 Marks)
b. Compare voltametry and potentiometry in the context of biosensor performance. (10 Marks)

Module-5

9 a. Describe the structure and working of paper-based microfluidic biosensors. (10 Marks)
b. Create a conceptual design of a wearable biosensor for sweat analysis. (10 Marks)

OR

10 a. Explain mobile biosensors applications in bacterial pathogen detection. (10 Marks)
b. Critically analyze the market challenges and future scope of textile-based bio-sensors. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.