

EIGHTH SEMESTER B.TECH. DEGREE EXAMINATION

(2013 SCHEME)

SUBJECT : 13.806.4 NANOSENSORS AND BIOSENSORS (A) (Elective VI)

Time: 3 hours

Max Marks: 100

PART A

(Answer all questions. Each question carries 4 marks)

1. Explain the role of proteins in nanotechnology.
2. Write short note on adsorption.
3. Differentiate between bio receptors and bio detectors.
4. List the applications of DNA chips.
5. With suitable schematic diagram, explain the working of photometric sensors.

PART B

(Answer any one question from each module. Each question carries 20 marks.)

MODULE 1

6. a. Explain the various physical effects involved in signal transduction.

10Marks

Contd.

- b. Discuss on AMR, Giant and colossal magneto resistors. **10Marks**

OR

7. a. Define density of states. Obtain the expression for Density of states for 3D materials. Compare the value with 2D materials. **10Marks**

- b. Describe the role of enzymes in sensing applications with suitable example. **10Marks**

MODULE 2

8. a. Differentiate between Nano array based detector and nano particle based detector. **10Marks**

- b. What are nano sensors? Mention the applications of nano sensors. **10 Marks**

OR

9. a. Explain Ultra-sensitive detection of pathogenic biomarkers in detail. **10 Marks**

- b. Differentiate between Nano tweezers and nano cutting tools. **10 Marks**

MODULE 3

10. a. Explain the operation of thin film transistors (TFTs) with its equivalent circuit. Also explain how it works as sensors. **10Marks**

- b. Discuss on electrical double layer. Briefly explain the Frequency response in Electrolyte environment. **10Marks**

OR

11. a. Differentiate between frequency response of MIS capacitors and MISFET devices. **10 Marks**

- b. Explain how impedance can be measured? What are the instruments used for impedance measurements. **10 Marks**

MODULE 4

12. a. With suitable schematic diagrams, explain the various optical spectroscopic techniques for biosensors.

10Marks

b. Discuss on capacitive ultrasonic transducers.

10 Marks

OR

13. a. Briefly explain the operation of MEMS cantilevers.

10 Marks

b. Discuss on mass sensitivities of acoustic wave devices.

10 Marks
