

CBCS SCHEME

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18BM821

Eighth Semester B.E. Degree Examination, July/August 2022 **Bio-MEMS**

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Define MEMS. Explain with diagram, MEMS as a microsensor. (06 Marks)
- b. Discuss typical MEMS and Microsystem products. (06 Marks)
- c. Explain with diagram, multidisciplinary nature of microsystem design and manufacture. (08 Marks)

OR

- 2 a. List and explain with neat diagram the working of chemical sensors. (10 Marks)
- b. Write short notes on (any two):
 - (i) Optical sensor
 - (ii) Biocompatibility
 - (iii) Thermal sensors(10 Marks)

Module-2

- 3 a. Define microactuation. Explain any three principle means of microactuation with necessary diagram. (10 Marks)
- b. Explain the followings:
 - (i) Microgripper
 - (ii) Ionization by electron beam method(10 Marks)

OR

- 4 a. Define Trimmer force scaling vector. Derive the expression for acceleration, time and power density. (10 Marks)
- b. Explain with diagram and expressions scaling in electrostatic force. (10 Marks)

Module-3

- 5 a. Explain bending of rectangular plate with all edge fixed. (10 Marks)
- b. Define damping. Explain over damping, critical damping and under damping with neat diagrams and expressions. (10 Marks)

OR

- 6 a. Explain with diagram and equations bending of circular plate with all edge fixed. (10 Marks)
- b. Explain the followings:
 - (i) Molecular Beacons
 - (ii) Chemiluminescence(10 Marks)

Module-4

- 7 a. Explain silicon as a ideal substrate material. (06 Marks)
- b. Briefly explain silicon compounds. (06 Marks)
- c. Explain types and applications of polymers. (08 Marks)

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.

OR

- 8 a. Explain about minimally invasive surgery. (10 Marks)
b. Explain the followings:
(i) Oncology
(ii) Cell based biosensors (10 Marks)

Module-5

- 9 a. Explain with neat diagrams steps involve in photolithography. (10 Marks)
b. Explain with diagram and expression chemical vapour deposition technique. (10 Marks)

OR

- 10 a. Explain with diagram etching technique. (10 Marks)
b. Explain about design constraints. (10 Marks)

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