F 3263 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Eighth Semester

Branch : Electronics and Communication Engineering/Electronics and Instrumentation Engineering

EI 010 804 L02/EC 010 804 L02—MICRO ELECTRO MECHANICAL SYSTEMS (Elective III) [EC, EI]

(New Scheme—2010 Admissions—Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. List out any three application of MEMS in industry.
2. Give a note on thermal actuation techniques.
3. How is plasma generated ?
4. Compare CVD and PVD techniques used in the fabrication process.
5. Mention one advantage and disadvantage of LIGA process.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Why cannot traditional manufacturing techniques like mechanical drilling, welding and milling be used to produce microsystems ?
7. What are shape memory alloys ? List two applications of shape memory alloys.
8. Write a short note on the various silicon compounds used in microsystems.
9. Give a note on diffusion process with necessary diagram.
10. Describe the role of sacrificial layers in surface micromachining.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Explain in detail the multidisciplinary nature of MEMS and microsystems with necessary examples.

Or

Turn over

12. (a) Explain with a block diagram the components of a microsystem. (8 marks)

    (b) Differentiate between MEMS and Microsystems with suitable example. (4 marks)

13. Explain in detail the construction and working of MEMS microacclerometers.

Or

14. Write short notes on microgrippers, micropumps and micromotors.

15. What is piezoelectric effect ? Explain how piezoelectric crystals can be used in the manufacture of MEMS and microsystems.

Or

16. What is a substrate ? List out the commonly used substrate materials. Give a detailed description about any one of them.

17. Write short notes on :

    (a) Deposition by epitaxy. (6 marks)

    (b) Sputtering. (6 marks)

Or

18. Explain in detail the photolithographic process involved in microsystem fabrication.

19. What do you mean by surface micromachining ? With necessary diagram, explain the different stages in it. List out the mechanical problems associated with surface micromachining.

Or

20. (a) List out the steps involved in LIGA process. (8 marks)

    (b) Compare the various micromanufacturing techniques used for MEMS devices. (4 marks)

[5 × 12 = 60 marks]