

B.E. Instrumentation Engineering Eighth Semester
IN 8042 - Elective-II : MEMS : Micro Electro Mechanical Systems

P. Pages : 2

Time : Three Hours



GUG/W/18/2065

Max. Marks : 80

- Notes :
1. Same answer book must be used for each question.
 2. All questions carry marks. as indicated.
 3. Due credit will be given to neatness and adequate dimensions.
 4. Assume suitable data wherever necessary.

1. a) Define microfabrication? List the various processes and explain any one in brief. 8
- b) A cylindrical silicon rod is pulled on both ends with a force of 10 mN. The rod is 1 mm long & 100 μ m in diameter. Find the stress and strain in longitudinal direction of rod. 8

OR

2. a) What are the general criteria while considering actuators design and selections? 8
- b) Discuss the intrinsic characteristics of MEMS. 8
3. a) Enlist applications of Parallel plate capacitors in MEMS? Explain in brief. 8
- b) Elaborate comb drive devices as Inertia sensors & actuators. 8

OR

4. a) Explain electrostatic sensors & actuators. 8
- b) Write short note on:- 8
- a) Parallel plate actuators
- b) Integrated finger actuators
5. a) Discuss the applications of piezoelectric MEMS devices? Explain any one in detail. 8
- b) Distinguish the properties of piezoelectric materials? 8

OR

6. a) What are the applications of piezoresistive MEMS sensors? Explain any one in details. 8
- b) What is piezoresistivity? Obtain an expression for output voltage using Wheatstone bridge. 8
7. a) Elaborate Anisotropic wet etching in retail. 8
- b) Illustrate basic surface micromachining process. 8

OR

8. a) Explain material selection criteria for two layer process. 8
- b) Explain stiction and anti-stiction methods in retails. 8
9. a) What is optical MEMS? Explain in brief. 8
- b) What is Perylene? Explain in brief. 8

OR

10. a) Write short note on polymers in MEMS? List the polymers widely used for MEMS applications. 8
- b) Write short notes on: **any two.** 8
- i) LCP
- ii) PMMA
- iii) SU - 8
