

[Time: 3 Hours]

[Marks:80]

Please check whether you have got the right question paper.

N.B: 1. Q. 1 is compulsory.

2. Attempt any three out of remaining questions.

3. Assume suitable data wherever required and justify the same.

Q.1 Attempt any four.

- a) What is MEMS? What is significant difference between Microelectronics and Microsystem? **20**
- b) Discuss the role of SU8 in MEMS applications.
- c) Define TCR & Stiffness and its significance wrt to MEMS
- d) What is Etch stop? Discuss it's techniques.
- e) Describe the phenomenon of Stiction, and possible ways to avoid it.

Q.2 a) Discuss the process flow of Photolithography. Explain the types of photoresist used. **10**

b) Explain silicon crystal structure. Why silicon is used as substrate material in MEMS? **10**

Q.3 a) Explain in details application of Polymers in MEMS. Why and How to make polymer conductive. **10**

b) What are the design considerations in Selection of MEMS materials? **10**

Q.4 a) Describe the process flow for fabricating micro heater. Also explain its working principle. **10**

b) List the types of pressure sensor and show the process steps for fabricating the piezoresistive pressure sensor. **10**

Q.5 a) What is MEMS micromachining? Explain in details fabrication process flow of LIGA. Why electroplating is necessary in LIGA process. **10**

b) Compare Deposition techniques used in MEMS with respect to their applications. **10**

Q.6 Write Short note on **20**

- a) Wire bonding
- b) MEMS Reliability
- c) Annealing
- d) Sensors in Biomedical Applications
