

35

B.E Degree Examination, May 2012
Department of Electrical & Electronics Engineering
CEG, Anna University
EE9040 MICRO ELECTRO MECHANICAL SYSTEMS
VII SEM EEE (R2008)

Time: 3 Hrs

Max.Marks: 100

Answer all questions

Part -A

10 x 2=20 Marks

1. What is the role of the photomask in a typical photolithography process?
2. Compare bulk and micro machining.
3. What is the need for sacrificial layer in surface micro machining?
4. How does a sensor device differ from a transducer element?
5. What is an inverse transducer? give an example
6. What is passive transducer? Give an example from its thermal type.
7. How do you represent a system, which consist of many elements of the same type.
8. What are the relative merits of biomedical MEMS devices
9. What is a MEMS micromirror?
10. Mention the properties of Piezo electric materials.

Part-B

5 x 16=80 Marks

11. a) With suitable schematic diagram , describe in detail the process of LIGA.

- 12 a) Explain the surface micromachining process sequence for fabrication of a micro motor.

[Or]
- 12 b) Explain the constructional details and principle of operation of a cantilever beam . List out the important process sequence with regard to the fabrication of a typical cantilever beam sensor.

- 13 a) With suitable diagram explain the working principle of parallel plate capacitor and also discuss the various application of parallel plate capacitor with regard to actuation and sensing.

[Or]
- 13 b) Describe the principle operation of various types of MEMS thermal flow sensors. Draw the schematic diagram of a differential type thermal flow sensor and explain.

- 14 a) Write down the Principal energy transduction methods that are employed for achieving actuation. Briefly explain their principle of operation. Write down some of the Important applications of microactuators.

[Or]

14 b) Write a technical note on the following

- (i) Micro Mirror for TV Projector (8)
- (ii) Micro Pumps and Micro valves (8)

15. a) Discuss in detail the various steps involved in fabrication of microarrays.

[Or]

15. b) Explain the principle of operation of various types of optical switches used in optical communication system.