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

Time: 3 Hrs Max.Marks: 100

Answer ALL Questions

Part -A 10 x 2=20 Marks

1. What Common methods, principles and process sequence do the IC and MEMS fabrications have?
2. How do you represent a system, which consist of many elements of the same type
3. Compare bulk and surface micromachining.
4. List the properties of silicon Nitride.
5. What is SMA? How does the SMA react to heat?
6. What are smart sensors? Mention its significances.
7. What is an active transducer? Give an example.
8. What are the relative merits of optical MEMS devices
9. What is a MEMS micromirror?
10. List the applications of RF-MEMS devices.

Part-B 5 x 16=80 Marks

11. a) With neat diagrams explain the different etching processes in detail.

12 a) i) List the properties and applications of piezo electric materials. (8)
(ii) With suitable diagram explain the principles of piezo electric micro cantilever beam. (8)

[Or]

12 b) Discuss the step by step approach of polysilicon surface micromachining process for a micro motor in detail.

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) (i) Describe the principle operation and applications of MEMS chemical sensors. (8)
(ii) Write a technical note on MEMS biosensors (8)

14 a) Describe the principle operation and fabrication process of electromagnetic and thermal micro actuators.

[Or]

14 b) With suitable diagrams explain the working principle of Microvalves and micropumps also discuss their various application with regard to actuation.

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

[Or]

15. b) With neat diagram explain the principle of operation of 3D electromagnetic actuators and sensors.