Seventh Semester B.Tech. Degree Examination, December 2016  
(2013 Scheme)  
13.706.2 : MEMS (AT)  
(Elective – IV)  

Time: 3 Hours  
Max. Marks: 100  

PART – A  

Answer all questions. Each question carries 2 marks:  

1. What is the significance of miniaturization?  
2. What do you mean by microfabrication?  
3. Differentiate between isotropic and anisotropic wet etching?  
4. Define shear strain.  
5. State Hookes’s law.  
6. A cylindrical silicon rod is pulled on both ends with a force of 10 mN. The rod is 1 mm long and 100 μm in diameter. Find the stress and strain in the longitudinal direction of the rod.  
7. What is meant by quality factor?  
8. Define thermistor.  
9. List the applications of Piezo-resistive sensors.  
10. What is PDMS?  

PART – B  

Answer any one question from each Module. Each question carries 20 marks:  

Module – I  

11. a) Write various process steps involved in MEMS fabrication with neat diagram.  
   b) Explain different types of etching methods in MEMS?  

   OR  

   P.T.O.
12. a) Discuss briefly about sensors and actuators with neat diagram.  
   b) Explain miniaturization and its challenges.

Module – II

13. a) Explain the deflection of beams. Derive the spring constant of cantilever.  
   b) Write short notes on torsional deflection.

   OR

14. a) Analyze the factors which influence the resistivity and conductivity of silicon semiconductor.  
   b) Explain the mechanical properties of Silicon and thin films.

Module – III

15. a) Draw the diagram of thermal actuators and explain the operation with an application.  
   b) What is comb drive? Discuss its importance in MEMS in detail.

   OR

16. a) Explain briefly how parallel plate capacitor can act as an actuator.  
   b) Write the principle of Electro static sensing and actuation for MEMS in detail.

Module – IV

17. a) Discuss PDMS and PMMA with neat block diagram.  
   b) Explain the role of polymers in MEMS.

   OR

18. a) Explain Piezo-electric sensing and actuation.  
   b) What is tactile sensor? Discuss the applications of tactile sensors.