Exam.Code:0932
Sub. Code: 33705

2056

B.E. (Electronics and Communication Engineering)

Eighth Semester

EC-814: MEMS and Microsystems

Time allowed: 3 Hours Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

1. Answer the following:-
   a) Differentiate between sensors and actuators in MEMS.
   b) What is bulk micromachining?
   c) Define aspect ratio in microfabrication.
   d) What are smart materials? Give their applications.
   e) Give the significance of thin films in MEMS devices? (5x2)

UNIT - I

2. (a) Explain thermal actuation in MEMS devices and compare it with electrostatic actuation.
   (b) Discuss the impact of scaling on mechanical stress and heat dissipation in microdevices. (2x5)
3. (a) Describe different wafer-level packaging techniques used in MEMS.
   (b) Explain the working principle and applications of infrared (IR) sensors. (2x5)
4. (a) Discuss different types of bonding techniques (anodic, fusion, adhesive) used in MEMS fabrication.
   (b) Explain the principle, construction, and applications of ultrasonic sensors. (2x5)

UNIT - II

5. (a) Differentiate between dry etching and wet etching with suitable examples.
   (b) Explain the importance of simulation and modeling in microsystem design. (2x5)
6. Write a note on:
   (a) Design for manufacturability (DFM) in MEMS fabrication.
   (b) Surface micromachining process and its applications. (2x5)
7. (a) Explain the concept of thin film deposition and describe any one deposition technique.
   (b) Discuss the importance of packaging in MEMS devices and its challenges. (2x5)

x-x-x