

Time: 3 Hours

Marks: 80

Note:1) Question No 1 is Compulsory.

2) Answer any three from the remaining questions.

3) Assume suitable data wherever required

- Q1. Solve any four of the following (20)
- a. Explain the role of MEMS sensors in IoT
 - b. Explain the sacrificial layer and its role in the fabrication of MEMS devices
 - c. Explain the principle of the Digital Mirror device
 - d. Define piezoresistivity and list out all piezo-resistive coefficient
 - e. Compare wet and Dry etching techniques
- Q2.a How MEMS pressure sensor convert pressure into equivalent electrical parameter, explain with its schematic representation and fabrication process steps (10)
- b. Define Reliability. Draw and explain the bath-tub-curve describing the MEMS device's reliability (10)
- Q3.a What are Polymers? Draw the role of SU8 and PMMA polymers in MEMS application (10)
- b. Describe the representative process flow for fabricating the cantilever structure (10)
- Q4.a Describe the DRIE process. How can DRIE achieve virtually perfect vertical etching? (10)
- b. Differentiate between bulk and surface micromachining for fabrication of MEMS device with suitable example (10)
- Q5.a List types of lithography. Explain in detail X-ray lithography and its major features (10)
- b. Describe the process flow for fabricating a microheater. Also, explain its working principle. (10)
- Q6. Write a Short note on (20)
- a. Wafer bonding techniques
 - b. MEMS Sensor in Biomedical Applications
 - c. Annealing
 - d. Micro Actuation Techniques
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