

Time: 3 Hours

Max. Marks: 80

Note: -

- Question no. 1 is compulsory.
- Answer any three out of remaining questions.
- Figures to right indicates full marks.
- Assume suitable data wherever necessary.

- Q.1 Answer any four** **20**
- A. Explain in brief Applications of MEMS in Military.
 - B. Explain DRIE in detail.
 - C. Differentiate between dry and wet etching techniques.
 - D. Explain role of Silicon carbide as MEMS material..
 - E. Explain principle of digital mirror device.
 - F. Define TCR, Thermoelectricity and its significance with respect to MEMS devices.
- Q.2** **10**
- A. Explain fabrication steps of thermal Ink-jet printer head by Hewlett Packard and explain its ink firing sequence.
 - B. List different types of lithography. Explain in detail X-ray lithography with its major features. **10**
- Q.3** **10**
- A. Explain step by step procedure of MEMS device fabrication.. **10**
 - B. Discuss selection of material based on application and explain advantages of silicon as MEMS material **10**
- Q.4** **10**
- A. How MEMS pressure sensors convert pressure into its equivalent electrical parameter, explain with its schematic representation and fabrication process steps. **10**
 - B. Differentiate between surface and bulk micromachining for fabrication of MEMS devices with suitable examples. **10**
- Q.5** **10**
- A. What do you understand by a clean room? Explain the steps in a standard RCA cycle during wafer cleaning. **10**
 - B. What is Cantilever ? Discuss role cantilevers in MEMS applications. **10**
- Q.6** **10**
- A. Explain various factors affecting reliability of MEMS devices. **10**
 - B. Write Short note on 1) Packaging of MEMS Devices. **10**
2) Micro-actuation techniques pertaining to MEMS Technology