

6. What is Lab-on-a-Chip (LOC)? How LOC devices are contributing to the following micro-biological experiments and analysis:
- DNA Extraction and Purification
  - Genomics
  - Proteomics
  - Drug Development.  $2+2 \times 4=10$
7. What is LIGA technology? Explain with proper diagram, how Sputter deposition technique is used for deposition of thin Metal films in substrate.  $2+8=10$
8. Explain the three basic parts of a MEMS device system with an example? Mention any four differences between MEMS and Microelectronics Technology.  $6+4=10$

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## B. Tech Odd Semester Examination, February, 2023

### Electronics & Communication Engineering (5th Semester)

Course No.: ECE-507D  
(Introduction to MEMS)

*Full Marks: 50*

*Pass Marks: 25*

*Time: 2 hours*

- Note:**
- Attempt any five questions.
  - Begin each answer in a new page.
  - Answer parts of a question at a place.
  - Assume reasonable data wherever required.
  - The figures in the right margin indicate full marks for the question.
  - All the mathematical symbols and abbreviations have their usual meanings.
- Describe hermetic and dual in-line packaging techniques used for MEMS devices  $5+5=10$
  - Discuss in brief the modeling levels from system to process, involved in design of a MEMS device. Also, categorize the various modeling techniques in MEMS, mentioning their accuracy and runtime complexity.  $6+4=10$
  - Give a brief description of the following MEMS simulators: COMSOL Multiphysics, CoventorWare, ANSYS, Intellisuite CAD simulators.  $2.5 \times 4=10$
  - What are Surface and Bulk Micromachining technologies? Explain with proper diagrams.  $5+5=10$
  - Discuss the microthruster systems used for nanosatellites in space.  $10$