

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIRST SEMESTER M.TECH DEGREE EXAMINATION (Regular), FEBRUARY 2022*(VLSI & Embedded Systems)***(2021 Scheme)****Course Code: 21VE105-B****Course Name: Introduction to MEMS****Max. Marks: 60****Duration: 3 Hours****PART A***(Answer all questions. Each question carries 3 marks)*

1. List any three types of polymers used in MEMS industry.
2. Compare bulk and surface micromachining.
3. Give in detail the advantages of using HTCC/LTCC in MEMS packaging.
4. Illustrate the working principle behind thermal sensor.
5. Outline actuation using piezoelectric crystals.
6. Define actuation using electrostatic forces.
7. Demonstrate using equations, the principle of operation of accelerometers.
8. Recall the principle of piezoresistive sensor.

PART B*(Answer one full question from each module, each question carries 6 marks)***MODULE I**

9. Write short notes on silicon compound materials. (6)

OR

10. Outline any three applications of MEMS (6)

MODULE II

11. With necessary diagrams, explain the various steps involved in the process of surface micromachining with a case study of cantilever fabrication. (6)

OR

12. Explain the Electroplating LIGA technique for MEMS fabrication. (6)

MODULE III

13. Classify different wire bonding techniques in microsystem packaging. (6)

OR

14. Explain packaging design of a micro pressure sensor. (6)

MODULE IV

15. Describe the working of an acoustic wave sensor with proper illustrations. (6)

OR

16. Illustrate capacitive pressure sensor (6)

MODULE V

17. Explain the working principles of micromechanical motors. (6)

OR

18. Compare Piezoelectric and Electrostatic micropumps. (6)

MODULE VI

19. Design a piezoresistive flow shear-stress sensor. (6)

OR

20. Design a piezoelectric plate gyroscope. (6)
