Register No.: ....   Name: ....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIRST SEMESTER M.TECH DEGREE EXAMINATION (Regular), DECEMBER 2022
VLSI AND 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. Differentiate between micro electronics and micro systems.
2. Describe: i) isotropic etching ii) anisotropic etching.
3. Differentiate between HTCC and LTCC.
4. Discuss any two applications of micro- magnetic sensor.
5. Explain the basic working principle of thermal actuators.
6. Discuss the principle of operation of micro valves.
7. With the help of equations, interpret the transduction principle of a gyroscope.
8. Use equations and describe the principles of piezo-resistive pressure sensor.

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

9. Describe two applications of MEMS.   (6)

OR

10. Organize short notes on silicon compound materials for MEMS devices.   (6)

MODULE II

11. Explain Surface Micromachining process with an example.   (6)

OR

12. Duplicate LIGA process in detail.   (6)

MODULE III

13. Describe the packaging design of a micro pressure sensor.   (6)

OR

14. Enumerate and explain the different wire bonding techniques in micro system packaging. (6)

MODULE IV

15. Give a detailed report on thermal sensors. (6)

OR

16. Elaborate on Radiation sensors. (6)

MODULE V

17. With neat diagrams, explain the working principle and applications of a micro-pump. (6)

OR

18. Discuss micro actuation with shape memory alloys. (6)

MODULE VI

19. Illustrate, using figures and equations, the working principle of a capacitive accelerometer in terms of 1) output voltage 2) magnitude of sense capacitance and 3) fabrication and packaging. (6)

OR

20. Illustrate, using figures and equations, the working principle of a Coriolis Rate Gyroscope with specific reference to tines and electrodes used in the device. (6)

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