Karunya Institute of Technology and Science

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MODEL QUESTION PAPER

Subject Title: **Introduction to MEMS**   **Time: 3 hours**
Subject Code: **09ME252**   **Maximum Marks: 100**

Answer All the Questions

PART – A (10x1=10 MARKS)

1. MEMS components range in size from _____ to _____.
2. Lab on a chip means _____.
3. Acoustic sensors are used to detect _____.
4. What is the main difference between Biosensors and Biomedical sensors?
5. A substrate is _____.
6. Why silicon is used in Microsystems?
7. Why is scaling laws important while learning about Microsystems?
8. What is the reason for electrostatic forces favored over electromagnetic forces in Microsystems?
9. Common light source used in photolithography is _____ with a wave length of _____.
10. Basic difference between Bulk micromachining and Surface micromachining is _____.

PART – B (5x3=15 MARKS)

11. Why cannot the traditional manufacturing technologies such as mechanical machining, forming and Welding be used to produce Microsystems?
12. Describe the three principal signal transduction methods for micro-pressure sensors. Provide at least one major advantage and disadvantage of each of these methods.
13. List some of the Peizo-electric materials and Peizo-resistive materials. Differentiate between them based on their property.
14. How scaling in geometry affect the property of a system? Give an example from the nature.
15. Brief about Ion Implantation technique to produce Microsystems.

PART – C (5x15=75 MARKS)

16. (a) What are MEMS and Microsystems? How will you classify them from the conventional systems?
        (5)

(b) Categorize the applications of MEMS and Microsystems and List all of them which were discussed during the lectures.   (10)

(OR)

17. (a) Describe the Evolution of Microfabrication.   (10)
    (b) Is MEMS a multidisciplinary field? Justify your view.   (5)

18. List the types of microsensors available in the market. With a neat sketch explain the working principal of any 2 type of sensors.   (15)

(OR)

19. What are the techniques used in MEMS for actuators? With neat sketch describe the working principal of any 2 type of micro-actuation techniques.   (15)

20. Write briefly about all the Substrate materials available in the market. List their applications individually.   (15)

(OR)

21. What is meant by packaging? What are the special requirements for packaging materials? Which material is used for packaging?   (15)

22. Explain scaling in Electrostatic forces.   (15)

(OR)

23. Explain scaling in heat conduction in heat convection.   (15)

24. Explain how oxidation principle is used in Microsystems fabrication processes.   (15)

(OR)

25. Describe about Bulk micromachining technique.   (15)

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