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**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_

**End Semester Examination – Nov/Dec - 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **12EE245** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **MICRO ELECTROMECHANICAL SYSTEMS** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | What is Photoresists? | (1) |
| 2. | Process of introducing controlled amount of foreign materials into selected regions of another material is called as \_\_\_\_\_\_\_\_\_\_\_\_\_\_. | (1) |
| 3. | Electro chemical etch stop is applicable only to Anisotropic etching. Say True or False. | (1) |
| 4. | What is the purpose of oxidation over silicon wafer? | (1) |
| 5. | State Hooke’s law. | (1) |
| 6. | \_\_\_\_\_\_\_\_\_\_\_\_ meter is used for airbag deployment in automobiles. | (1) |
| 7. | What are the three main signal transduction methods for micropressure sensors? | (1) |
| 8. | Name the device used to reduce frictional losses between two moving object or one moving and another fixed object. | (1) |
| 9. | Why artificial respiration is required for patients? | (1) |
| 10. | State the principle of operation of pressure sensor in Blood pressure measurement. | (1) |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11. | Write short notes on Free Radical Polymerization. | (3) |
| 12. | How Polycrystalline film is deposited using Pyrolysis process? | (3) |
| 13. | Draw the structure of Serpentine and Box spring. | (3) |
| 14. | Write down the initial and boundary conditions for solving the Fick’s diffusion equation. | (3) |
| 15. | Explain briefly the MEMS based Infusion pumps. | (3) |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. | a. | List out the desirable features that a smart material should possess. | (5) |
| b. | Describe about the families of smart materials used to fabricate MEMS devices. | (10) |
| (OR) | | | |
| 17. |  | Discuss in detail the history, components and applications of MEMS. | (15) |
| 18. | a. | With a neat diagram, explain the process of Ion implantation. | (7) |
| b. | Explain how Wet and Dry etching is done in micro fabrication. | (8) |
| (OR) | | | |
| 19. | a. | Illustrate the LIGA process of micromachining with an example. | (10) |
| b. | Point out the mechanical problems associated with Surface micromachining. | (5) |
| 20. |  | Write short notes on (i) Micro Thermal sensors (ii) Capacitive Pressure sensors | (7+8) |
| (OR) | | | |
| 21. |  | Describe the working principle of MEMS microaccelerometers with necessary diagrams. | (15) |
| 22. |  | Write down the step by step process in designing a Microgripper using Intellisuite CAD package. | (15) |
| (OR) | | | |
| 23. |  | Discuss the essential technologies that are necessary for packaging Micro systems. |  |
| 24. |  | Explain how MEMS technology is employed in artificial respiration and Blood pressure monitoring. | (15) |
| (OR) | | | |
| 25. |  | Enumerate the role of MEMS in Robotics with an example. | (15) |

ALL THE BEST