

Reg.No. _____



Karunya UNIVERSITY

(Karunya Institute of Technology & Sciences)
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Nov/Dec – 2016

Code : **14EC2087**
Sub. Name : **Micro Electro Mchanical Systems**

Semester : **2016-17 ODD**
Duration : **3hrs**
Max. marks : **100**

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

| Q. No. | Sub Div. | Questions | Course Outcome | Marks |
|--------------------|----------|---|----------------|-------|
| 1. | a. | Discuss in detail about doping of semiconductors. Also discuss the importance of p type and n type doping with neat diagrams. | CO1 | 15 |
| | b. | Define plasma and the activities that happen in plasma generator. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Point out the history and the developments in MEMS industry. | CO1 | 14 |
| | b. | Discuss the rules to be followed in constructing the periodic table. | CO1 | 6 |
| 3. | a. | Discuss various silicon compounds used in MEMS industry. | CO2 | 15 |
| | b. | Briefly discuss the significance of miller indices. | CO1 | 5 |
| (OR) | | | | |
| 4. | a. | Discuss the process of electroplating in detail | CO1 | 15 |
| | b. | Define Fick's law. Explain | CO1 | 5 |
| 5. | a. | Discuss the characteristics and the properties of silicon piezoresistors in microsensors. | CO2 | 15 |
| | b. | List out the applications of polymers in MEMS and Microsystems. | CO2 | 5 |
| (OR) | | | | |
| 6. | a. | Explain chemical sensors and explain the types of chemical sensors in detail | CO1 | 12 |
| | b. | A parallel capacitor is made of two square plates with the dimensions $L = W = 1000\mu\text{m}$. Determine the normal electrostatic force if the gap between these two plates is $d = 2\mu\text{m}$. The plates are separated by static air | CO1 | 8 |
| 7. | a. | Discuss a two layer surface micromachining with neat diagrams. Also explain the mechanical problems associated with surface micromachining. | CO1 | 20 |
| (OR) | | | | |
| 8. | a. | Explain in detail about the types of biological sensors used in MEMS industry with necessary diagrams. | CO1 | 10 |
| | b. | Explain in detail the construction and classification of pressure sensors. | CO1 | 10 |
| Compulsory: | | | | |
| 9. | a. | Explain the significance of RF electronic devices in MEMS industry. Mention the types and the working of MEMS switches. | CO1 | 20 |

ALL THE BEST

Course Outcome:

Students at the end of the course will be able to:

CO1: The students will understand the necessity of MEMS in thrust areas like sensors & actuators

CO2 : They will know the Materials used in Microsystems and the devices in nano electronics.