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

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**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **17EI3030** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MEMS TECHNOLOGY FOR EMBEDDED DESIGN** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Briefly explain about the diffusion and Epitaxy methods with neat sketch. | CO1 | 10 |
| b. | Explain in detail on electrostatic sensing and actuation. | CO3 | 10 |
| (OR) | | | | |
| 2. | a. | Discuss in detail about the applications of MEMS. | CO4 | 10 |
| b. | Summarize the detailed block diagram & fabrication process of MEMS. | CO6 | 10 |
|  |  |  |  |  |
| 3. | a. | Briefly discuss on the materials of MEMS in various fabrication methods. | CO5 | 10 |
| b. | Write short note on CVD process with a neat sketch. | CO2 | 10 |
| (OR) | | | | |
| 4. | a. | With a neat sketch explain the patterning process using Photolithography method. | CO5 | 10 |
| b. | Illustrate the sputtering and Oxidation methods with neat diagram. | CO6 | 10 |
|  |  |  |  |  |
| 5. | a. | Illustrate cantilevers for data storage and retrieval of thermal transfer based sensing. | CO4 | 10 |
| b. | Summarize in detail about the thermal sensing and actuation principle with an example. | CO1 | 10 |
| (OR) | | | | |
| 6. | a. | With the neat diagram explain in detail about comb drive actuator with large displacement. | CO2 | 10 |
| b. | Describe the thermal accelerometer with no moving mass based on thermal transfer principle with neat diagram. | CO3 | 10 |
|  |  |  |  |  |
| 7. | a. | Explain on membrane based piezoelectric accelerometer. | CO4 | 10 |
| b. | Discuss in detail on PZT piezoelectric microphone with a schematic diagram of cantilever type. | CO6 | 10 |
| (OR) | | | | |  |  |
| 8. | a. | Discuss in detail on bulk micro-machined crystal silicon accelerometer with a fabrication process. | CO1 | 10 |
| b. | Explain on flow rate sensor using piezoelectric sensing and actuation principle with neat sketch. | CO3 | 10 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Briefly explain the method of fluid movement in channels with the microfluidic applications. | CO2 | 10 |
| b. | Draw and explain the variable reluctance magnetic micro motor with the construction and working principle. | CO5 | 10 |