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



**End Semester Examination – Nov / Dec – 2019**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code :** | **17EI2044** | **Duration :** | **3hrs** |
| **Sub. Name :** | **NANO SCALE SENSORS AND TRANSDUCERS** | **Max. Marks :** | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Summarize on Quantum Dot Array with its relevant circuit diagram. | CO2 | 10 |
| b. | With the neat sketch explain the working principle of split gate transistor. | CO2 | 10 |
| **(OR)** | | | | |
| 2. | a. | Explain in detail on Quantum cellular automata with the logic gate examples. | CO2 | 10 |
| b. | Describe in detail on the mesoscopic structure with neat diagram. | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | Explain the nano sensor applications in Aerospace and Micro Fluidics. | CO3 | 10 |
| b. | Describe in detail on Transistor using tunneling principle with the neat circuit diagram. | CO3 | 10 |
| **(OR)** | | | | |
| 4. | a. | Explain the block diagram of MEMS with its fabrication process involved to manufacture IC. | CO3 | 10 |
| b. | Write short note on the cutting tools used in Nano sensors and actuators with the diagram. | CO4 | 10 |
|  |  |  |  |  |
| 5. | a. | Discuss on Resonant Tunnel diode with various stages in VI characteristics. | CO4 | 10 |
| b. | Explain in detail on the method of packaging at zero level, dye level and first level. | CO3 | 10 |
| **(OR)** | | | | |
| 6. | a. | Describe the Single Electron Transistor adder as an example of a Distributed Circuit. | CO4 | 10 |
| b. | Explain the techniques of immobilization of bioreceptors with the block diagrams. | CO4 | 10 |
|  |  |  |  |  |
| 7. | a. | Explain the mass based method of transducer used in biosensor. | CO5 | 10 |
| b. | Explain in detail about the fiber optics and optical measurement with a general block diagram. | CO5 | 10 |
| **(OR)** | | | | |
| 8. |  | Summarize in detail on various bioreceptors used in biosensor for measuring the concentration of a specific substance in a biological analyte. | CO6 | 20 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Discuss in detail on Inertia sensor with the microaccelerometer working principle. | CO6 | 10 |
| b. | With the neat sketch explain the pressure sensor working principle using piezoresistors. | CO6 | 10 |