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



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

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| **Code :** | **16NT3013** | **Duration :** | **3hrs** |
| **Sub. Name :** | **NANOSCALE TRANSISTORS** | **Max. Marks :** | **100** |

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

|  |  |  |  |  |
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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Determine the short channel effect and DIBL with energy band diagram and discuss with VDT model. | CO1 | 20 |
| **(OR)** | | | | |
| 2. | a. | Design the various electrical parameters of transistor by considering it as a black box. | CO1 | 15 |
| b. | Compare diffusion and ballistic transport of electron in the channel. | CO1 | 5 |
|  |  |  |  |  |
| 3. |  | Explain the gate geometry and electrostatic integrity of the various structures of nanoscale transistor. | CO1 | 20 |
| **(OR)** | | | | |
| 4. | a. | Explain in detail how to reduce the short-channel effects by using Poisson's equation. | CO2 | 10 |
| b. | Analyze and obtain the effective Fin width (W*eff*) from Fin height and pitch. | CO2 | 10 |
|  |  |  |  |  |
| 5. |  | Elaborate in detail the fabrication sequence of Tri-gate MOSFET with suitable diagram. | CO2 | 20 |
| **(OR)** | | | | |
| 6. |  | Discuss in detail the gate stack of Fin FET and elaborate in detail the polysiliconas gate material. | CO2 | 20 |
|  |  |  |  |  |
| 7. |  | Elaborate in detail the strain engineering used for the enhancement of mobility in the FinFETs. | CO2 | 20 |
| **(OR)** | | | | |
| 8. |  | Elaborate the fabrication concept of fully silicided metal gate with neat diagram. | CO1 | 20 |
|  | | **Compulsory**: |  |  |
| 9. |  | Describe in detail the function of gate all around transistor with its channel and various high –K gate dielectric materials. | CO3 | 20 |