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

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

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| **Code :** | **16NT3003** | **Duration :** | **3hrs** |
| **Sub. Name :** | **NANOLITHOGRAPHY** | **Max. Marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Describe in detail the various steps involved in lithography process with schematic illustration. | CO1 | 20 |
| **(OR)** | | | | |
| 2. |  | Assuming a positive photo resist, design the fabrication process of BJT with a neat diagram. | CO3 | 20 |
| 3. |  | Explain the instrumentation, sources, scattering techniques, advantages and disadvantages of charged particle lithography. | CO2 | 20 |
| **(OR)** | | | | |
| 4. | a. | Explain in detail the fabrication of N-MOS using negative resist with schematic illustration. | CO3 | 10 |
| b. | Briefly explain the lithography technique which is a hybrid of top-down and bottom-up approaches. | CO2 | 10 |
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| 5. | a. | Explain the working principle of Scattering with Angular Limitation Projection Electron beam Lithography (SCALPEL) with schematic illustration. | CO2 | 10 |
| b. | Discuss in detail the different types of Nano imprint Lithography. | CO2 | 10 |
| **(OR)** | | | | |
| 6. | a. | What is soft lithography? | CO2 | 2 |
| b | Draw a flow chart representing the different types of soft lithography. | CO2 | 3 |
| c | Explain the different types of replica moulding with a neat diagram. | CO2 | 15 |
|  |  |  |  |  |
| 7. | a. | Write in detail the Focussed Ion Beam (FIB) lithography. | CO2 | 10 |
| b. | Sketch the various steps involved in lithography process using negative photoresist to obtain below image.  screen-14 | CO2 | 10 |
| **(OR)** | | | | |
| 8. |  | Explain in detail the lithography technique which is based on the working principle of capillary flow. | CO2 | 20 |
|  | | **Compulsory:** |  |  |
| 9. |  | Describe in detail the fabrication process of CMOS invertor from a positive resist with a neat schematic illustration using n –well process. | CO3 | 20 |