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

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

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| **Code :** | **17NT2002** | **Duration : 3 hrs** | |  | |
| **Sub. Name :** | **SYNTHESIS OF NANOMATERIALS** | **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. | Sketch the various steps involved in lithography process. | CO1 | 10 |
| b. | Discuss any two methods for the synthesis of CNT. | CO2 | 10 |
| **(OR)** | | | | |
| 2 | a | Draw the flow chart for different types of soft lithographies. | CO1 | 5 |
| b | Diagramatically explain the types of replica moulding. | CO1 | 15 |
|  |  |  |  |  |
| 3 | a. | Draw a flow chart representing the various steps involved in the synthesis of GO using modified Hummers method. | CO2 | 10 |
| b. | How to prepare TiO2 nanoparticles using sol-gel method? | CO2 | 5 |
| c. | What are the different stages involved in sonochemical technique? | CO2 | 5 |
| **(OR)** | | | | |
| 4. | a. | Briefly discuss the principle and working of Spray pyrolysis technique. | CO1 | 10 |
| b. | Explain the various chemical reactions involved in the CVD process. | CO2 | 10 |
|  |  |  |  |  |
| 5 |  | Discuss the working principle of sputter deposition technique and the different types of sputtering with a neat diagram. | CO1 | 20 |
| **(OR)** | | | | |
| 6 | a | Explain the working principle of electroplating. | CO1 | 5 |
| b | Draw and explain the graph between DOS and energy for 3D,2D,1D and 0D with an example. | CO1 | 5 |
| c | Distinguish PVD from CVD. | CO2 | 3 |
| d | List the factors controlling particle size in ball milling. | CO1 | 3 |
| e | Distinguish electro plating from electroless plating. | CO1 | 4 |
|  |  |  |  |  |
| 7 |  | Briefly write the procedure to prepare zirconia and tungsten carbide balls in ball milling process. | CO1 | 20 |
| **(OR)** | | | | |
| 8 |  | Explain in detail the instrumentation and working principle of Molecular Beam Epitaxy (MBE). | CO1 | 20 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Explain in detail the different types of annealing in severe plastic deformation (SPD). | CO1 | 10 |
| b. | Write a detailed note on melt quenching. | CO1 | 10 |