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

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

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| **Code :** | **14CH2023** | **Duration :** | **3hrs** |
| **Sub. Name :** | **APPLIED NANOCHEMISTRY AND NEXT GENERATION MATERIALS** | **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. | Write a short note on the history of nanomaterials. | CO1 | 8 |
| b. | Explain the sol-gel process to fabricate nanomaterials. | CO1 | 12 |
| (OR) | | | | |
| 2. | a. | Explain briefly the following  i) Nanomaterials ii) Nanomaterials in living species iii) Swarna bhama iv) Surface to volume ratio v) Semiconductor nanomaterial | CO1 | 10 |
| b. | Write an essay on ball milling and chemical vapour deposition techniques to fabricate nanomaterials. | CO1 | 10 |
| 3. | a. | Describe the synthesis, properties and application of quantum dots in electronics. | CO2 | 10 |
| b. | Identify the material in the picture and discuss on the preparation and its application? | CO2 | 10 |
| (OR) | | | | |
| 4. | a. | Define epitaxy. Explain the types of epitaxy with example. | CO1 | 10 |
| b. | Differentiate between nanorods and nanowires. How are nanowires fabricated using VLS growth. | CO1 | 10 |
| 5. | a. | Discuss any one method to synthesize fullerene. What are their applications and advantages over conventional materials. | CO2 | 10 |
| b. | Explain in detail molecular beam epitaxy. | CO1 | 10 |
| (OR) | | | | |
| 6. | a. | What is SEM? Explain the technique and working and disadvantages over other techniques. | CO1 | 15 |
| b. | Differentiate between graphite, graphene and graphene oxide. | CO1 | 5 |
| 7. | a. | Differentiate between SEM and TEM. | CO1 | 6 |
| b. | What are the processes involved in photolithography? Explain with neat diagram. | CO1 | 14 |
| (OR) | | | | |
| 8. | a. | Explain with neat sketch the instrumentation, working and applications of STM. | CO2 | 14 |
| b. | Discuss on the electrical properties of graphene. | CO2 | 6 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Propose any five materials as next generation materials and discuss on their properties which made you to consider them as next generation materials. | CO2 | 10 |
| b. | How are the nanomaterials used in the diagnosis and treatment of various diseases? | CO2 | 10 |