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**School of Basic Sciences**  
Bachelor of Science Honours in Chemistry  
Semester End Examination - May 2024

Duration : 180 Minutes  
Max Marks : 100

**Sem VI - C1UB603B - Basics of Nanoscience and Synthetic Application**

General Instructions

Answer to the specific question asked

Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

- 1) Define phenomenon of chemical vapor deposition (CVD), and how is it utilized in nanomaterial synthesis? K1 (3)
- 2) Explain the key components and operating principle of Dip-Pen Nanolithography (DPN) and discuss its significance in nanotechnology. K2 (4)
- 3) Explain the synthesis of nanowires and fabrication of nanostructures, highlighting key methods and techniques used in the process. K2 (6)
- 4) Illustrate the challenges associated with controlling nanoparticle size and morphology during spray pyrolysis? K3 (6)
- 5) Illustrate the properties, and applications of graphene and evaluate their significance in various fields. K3 (6)
- 6) Illustrate the fundamental principles of nanospintronics and how they differ from traditional electronics. K3 (9)
- 7) Illustrate metal-metal nanocomposites highlighting composition and properties, and their significance in materials science. K3 (9)
- 8) Analyze the various synthesis methods for nanowires and nanostructure fabrication, and their advantages. K4 (8)
- 9) Analyze the differences between traditional materials and nanomaterials, considering their structural, chemical, physical, and functional properties. K4 (12)
- 10) Examine the impact of functionalization techniques on the properties and performance of carbon nanotubes. K5 (10)

- 11) Examine the role of dopants and co-catalysts in optimizing the performance of TiO<sub>2</sub>-based solar cells. K5 (15)

**OR**

Examine the potential applications of fullerenes in various fields, based on their unique chemical and physical properties. K5 (15)

- 12) Discuss the wide range of applications of graphene across various fields, elucidating its unique properties and versatility. K6 (12)

**OR**

Discuss the factors such as processing parameters, reinforcement morphology, and interface bonding influence the final characteristics of metal-ceramic composites K6 (12)