

School of Computing Science and Engineering

**Bachelor of Technology in Computer Science and Engineering
Semester End Examination - Jun 2024**

**Duration : 180 Minutes
Max Marks : 100**

Sem VI - E2UC513T - Nano Science and Nano Technology*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 the process of doping carbon nanotubes with boron or nitrogen atoms and explain how it affects the electronic properties of the nanotubes. K1(3)
- 2) Explain the concept of Nanospintronics and its potential applications in information processing and storage? K2(4)
- 3) Explain the process of charge carrier generation in semiconductor nanostructures upon absorption of photons. K2(6)
- 4) Illustrate gas phase synthesis (GPS) of nanomaterials. K3(6)
- 5) Illustrate the phenomenon of charge transfer across semiconductor-electrolyte interfaces in electrochemical cells. K3(6)
- 6) Illustrate the key characteristics of semiconductor electrodes used in electrochemical applications, including band structure, charge carrier mobility, and surface properties. K3(9)
- 7) Illustrate the factors that affect the kinetics of charge transfer processes at semiconductor-electrolyte interfaces. K3(9)
- 8) Analyse the major properties and applications of fullerene. K4(8)
- 9) Analyze the mechanism and working principle of Liquid Junction Solar Cells K4(12)
- 10) Examine the role of nano catalysts in hydroprocessing reactions in the petrochemical industry. K5(10)
- 11) Examine the parameters affecting nanocatalysis. K5(15)

OR

Examine the use of nano catalysts as photocatalysts for K5(15)

environmental remediation and solar-driven water splitting reactions.

- 12) Discuss the advantages of DLC coatings in each application, including wear resistance, corrosion protection, biocompatibility, and electrical insulation. K6(12)

OR

Elaborate the fundamental principles of Pulsed Laser Deposition (PLD) and its significance in thin film fabrication. K6(12)