**Avinashilingam Institute for Home Science and Higher Education for Women**
(Deemed to be University Estd. u/s 3 of UGC Act 1956, Category 'A' by MHRD
Re-accredited with A++ Grade by NAAC CGPA 3.65/4, Category I by UGC
Coimbatore - 641 043, Tamil Nadu, India
**Continuous Internal Assessment -II–April-2025**
**Semester II**

**Class : I PG** **Time: 2 hour**
**Major : Physics** **Max. Marks: 60**

**23MCHI01- Nanomaterials and their Applications**

**Course Outcomes**

1. Appreciate the state of art developments in nanotechnology
2. Identify common themes across nanotechnology
3. Predict major properties of metal nanoparticles and carbon clusters
4. Identify the various characterization methods for nanoparticles
5. Analyze the evolving interfaces of nanotechnology, and advancements

## Part A

**Choose the correct answer** **6 x 1 = 6**

1. What is the primary source of illumination in a Scanning Electron Microscope (SEM) CO3K4
   a. Visible light b. X-rays
   c. Electrons d. Ultraviolet rays
2. Which property of carbon nanotubes makes them highly conductive? CO3K5
   a. Presence of metallic impurities b. Delocalized π electrons
   c. High atomic weight d. Large band gap
3. Quantum dots can be used in _____. CO4K1
   a. Crystallography b. Optoelectronics
   c. Mechanics d. Quantum physics
4. The main purpose of CNTs in fuel cells is _____ CO4K2
   a. Production of energy b. Active medium
   c. Catalyst d. Storage
5. Which nanomaterial is used for cutting tools? CO5K1
   a. Graphene b. Fullerene
   c. Tungsten Carbide d. Gold
6. Which property of Nanomaterials make them suitable to be used for elimination of pollutants? CO5K1
   a. High purity b. Better thermal conductivity
   c. Enhanced chemical activity d. Small size

## Part B **3 x 6 = 18**

**Answer ALL questions**
**Each answer should not exceed 400 words or two pages**

7.a. Explain the working principle of Scanning Electron Microscopy CO3K4

(or)

7.b. Decsribe the application of nanoparticles in the field of medicine with suitable examples CO3K5

8.a. Discuss the applications of carbon dots. CO4K2

(or)

8.b. Enumerate the importance of carbon clusters and $C_{60}$. CO4K2

9.a. Describe the importance of nano applications in environmental protection CO5K2

(or)

9.b. What is biochemical sensor? And how does it contribute to water purification? CO5K2

**Part C** **3 x 12 = 36**

**Answer ALL questions**

**Each answer should not exceed 800 words or four pages**

10.a. Explain the characterization method of nano compounds using Scanning Transmission Electron Microscope CO3K4

(or)

10.b. How raman spectroscopy influenced the structural characterisation of a nano compound CO3K4

11.a. Describe the importance of nano wires and applications in carbon nano tubes. CO4K3

(or)

11.b. Explain the synthesis, structure and characterization of carbon nano tubes. CO4K1

12.a. Explain the application of metal nanoparticles in textiles and optical. CO5K3

(or)

12. b. Summarize the biological application of metal nanoparticles CO5K3

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**Staff in Charge : Dr. A. Akila & Dr. Neethu K S**