

BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE

CHEMISTRY DEPARTMENT

AUG 2024

BSc Chemical Technology and BSc Education

COURSE: CH 452/CH 405: NANO CHEMISTRY/Nanotechnology

Duration : 2 Hrs

ANSWER ANY FIVE (5) QUESTIONS. EACH QUESTION CARRIES 20 MARKS.

1. (a) List three different ways of synthesising carbon nanotubes. **6 marks**
(b) Describe the one method used for the synthesis of carbon nanotubes and the benefits or disadvantages of that method. **6 marks**
(c) Give 4 applications of silver nanomaterials and explain how they are used in healthcare. **8 marks**
2. Describe the general toxicity associated with nanoparticles and other nanomaterials. **20 marks**
3. Describe the application of nanoparticles in protein detection. **20 marks**
4. (a) Using diagrams, outline the chemical vapour deposition technique. Give an example of a specific material that can be synthesised using this technique. **15 marks**
(b) What is the Scherrer equation and what is its significance in nanotechnology. **5 marks**
5. (a) Nano particles are broadly divided into various categories depending on their morphology, size and chemical properties. State any 5 classes in which nanoparticles are grouped. **10 marks**

(b) Complete the table below:

	Physiochemical Property	elucidation technique
1	Morphology	
2	Surface force measurement	
3	Surface roughness	
4	Imaging with atomic level resolution	
5	Lattice parameters	

10 marks

6. (a) Define the following: Quantum Well, Quantum Dot, Top-down approach, 6 marks
- (b) What is the difference between nanoscience and nanotechnology? 6 marks
- (c) State any three factors of concern that will influence drug delivery. 6 marks
- (d) What is the difference between an aggregate and an agglomerate? 2 marks

End of Question Paper