

# BINDURA UNIVERSITY OF SCIENCE EDUCATION

## FACULTY OF SCIENCE

### CHEMISTRY DEPARTMENT

**JAN 2025**

#### 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.**

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1. (a) State 5 properties of materials that can be altered by patterning matter on the nanometer length, such that the chemical composition remains unchanged. **10 marks**  
 (b) State any 5 differences in material properties between bulk gold and nano gold. **10 marks**
2. Complete the table below:

	Property	Elucidation technique
1	morphology	
2	Surface force measurement	
3	Surface roughness	
4	Imaging with atomic level resolution	
5	Lattice parameters	

**10 marks**

3. (a) Nano particles are broadly divided into various categories depending on their morphology, size and chemical properties. State any 5 classes in which these nanoparticles are grouped. **10 marks**  
 (b) State five applications of nano-particles. **10 marks**
4. (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) What is the commercial application of Silver nanoparticles? **2 marks**  
 (d) State any three factors that influence drug delivery. **6 marks**
5. Describe the general toxicity associated with nanoparticles. **20 marks**
6. Describe how nanoparticles are utilised in protein detection. **20 marks**

**The End of Question Paper**