



**MASINDE MULIRO UNIVERSITY OF  
SCIENCE AND TECHNOLOGY  
(MMUST)**

**MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS  
2022/2023 ACADEMIC YEAR**

**MAIN EXAMINATION**

**FOURTH YEAR SECOND SEMESTER EXAMINATIONS**

**FOR THE DEGREE**

**OF**

**BACHELOR OF SCIENCE IN BIOTECHNOLOGY**

**COURSE CODE: SBT 421**

**COURSE TITLE: NANO SCIENCE AND TECHNOLOGY**

**DATE: THURSDAY, 13<sup>TH</sup> APRIL 2023**

**TIME: 8:00 – 10:00 A.M.**

**INSTRUCTIONS TO CANDIDATES**

Answer **ALL** questions in section A and any **TWO** selected from section B

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consist of 2 Printed Pages. Please Turn Over



**SECTION A (SHORT ANSWER QUESTIONS, 40MARKS)**

1. a) Define nano-materials (1 mark)  
b) Explain two uses of nano-materials in biotechnology. (4 marks)
2. Name features of biosensors. (5 marks)
3. Explain the applications of quantum dots in cancer therapeutics. (5 marks)
4. Describe the application of molecular recognition elements in nano-sensing of analytes. (5 marks)
5. Briefly explain the concept of lab-on chip. (5 marks)
6. Outline the characteristics of a good transducer element as a component of nano-biosensing.(5 marks)
7. List different types of drugs that are delivered by liposomes to target cells. (5 marks)
8. Name clinical applications of nanobiotechnology. (5 marks)

**SECTION B (ESSAY QUESTIONS, 30 MARKS)**

9. Explain three types of nano devices used for drug delivery. (15 marks)
10. Discuss applications of nano-biotechnology in health and diseases. (15 marks)
11. Discuss three types of nano-materials used in biotechnology. (15 marks)