



**KISII UNIVERSITY**  
**UNIVERSITY EXAMINATIONS**

**THIRD YEAR EXAMINATION FOR THE AWARD OF**  
**THE DEGREE OF BACHELOR OF EDUCATION SCIENCE AND ANALYTICAL**  
**CHEMISTRY AND INDUSTRIAL AGRICULTURE**  
**SECOND SEMESTER 2021/2022**  
**(FEBRUARY-JUNE, 2022)**

**CHEM 319: NANOCHEMISTRY**

**STREAM: Y3 S2**

**TIME: 2 HOURS**

**DAY: THURSDAY, 9.00 AM – 11.00 AM**

**DATE: 2/06/2022**

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**INSTRUCTIONS:**

- 1. Do not write anything on this question paper.***
- 2. Answer ALL questions in section a and any TWO questions in section B***

**SECTION A: Answer all questions (40 MARKS)**

- List out challenges faced by Nanotechnology. (4 marks)
- Explain why carbon nanotubes are 20 times stronger than steel. (3 marks)
- Differentiate the following: (6 marks)
  - Electron microscopy and optical microscopy
  - SWCNTs and MWCNTs
  - Raman scattering and Rayleigh scattering.

4. State the advantages of scanning lithography over photolithography. (3marks)
5. Briefly explain the properties of fullerene. (6 marks)
6. Why do the band gap of nanomaterials increase with size reduction. (3marks)
7. Clarify the advantages of nanosensing. (4 marks)
8. Briefly describe Sol-Gel method. (5 marks)
9. List chemical properties that change with change of size of NPs (2 marks)
10. Explain the principle of XRD analysis of NPs (4 marks)

**SECTION B: Answer two questions**

11. Explain in detail electrical, magnetic, and mechanical properties of nano-structured materials. (15 marks)
12. Describe the application of nanomaterials. (15 marks)
13. Discuss Top down approach of fabrication of Nanomaterials. (15 marks)