



(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

(MAIN CAMPUS)

UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

THIRD YEAR SECOND SEMESTER MAIN EXAMINATIONS

FOR THE DIPLOMA
OF
MEDICAL BIOTECHNOLOGY

COURSE CODE: BBD 329

COURSE TITLE: BIO-NANOTECHNOLOGY

DATE: 24TH APRIL 2023

TIME: 11.00AM – 1.00PM

INSTRUCTIONS TO CANDIDATES

This paper is divided into three sections, **A B** and **C**, carrying respectively: Multiple Choice Questions (**MCQs**), Short Answer Questions (**SAQs**) and Long Answer Questions (**LAQs**). **Answer all questions. DO NOT WRITE ON THE QUESTION PAPER.**

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over.

SECTION A: Multiple Choice Questions (20Marks)

- 1). Which one of the following is an example for semiconducting nanowires?
A Nickel
B Platinum
C Silicon
D All of the above
- 2). The absorption and adsorption of molecules are fast and high in _____ materials?
A Nanomaterials
B Bulk materials
C Both a and b
D None of the above
- 3). Which one of the following is an example for thermal properties of nanostructure?
A Melting temperature
B Absorption and scattering of light
C Both a and b
D None of the above
- 4). In which year does the scanning tunneling microscopy was invented?
A 1999
B 2003
C 1934
D 1982
- 5). Who discovered nanotubes?
A Gerd Binnig
B Alex Zwetl
C PM Alayna
D Sumio Iijima
- 6). Who is the co-discover of the buckminsterfullerene?
A Gerd Binnig
B Hardy Kroto
C PM Alayna
D Sumio Iijima
- 7). Who built the first molecular motor based on CNT?
A Gerd Binnig
B Hardy Kroto
C PM Alayna
D Alex Zwetl
- 8). Which one of the following is an example for electrical properties of nanostructure?
A Melting temperature
B Tunneling current
C Both a and b
D None of the above
- 9). Which one of the following used in solar cells?
A Carbon nanotube

- B Nanorods
 - C Nanobots
 - D Nanoscale
- 10). What is the standard form of SEM?
- A Scanning Electron Microscope
 - B Scanning Electrode Microscope
 - C Scanning Electrical Microscope
 - D None of the above
- 11). Which one of the following is an example for insulating nanowires?
- A SiO₂
 - B InP
 - C Si
 - D All of the above
- 12). The NEMS/MEMS, reciprocates, and microarrays are types of _____ ?
- A Nanodevices
 - B Nanocrystalline nanoparticle
 - C Nanostructured nanoparticle
 - D None of the above
- 13). The size of polymeric nanoparticle Nano system is around _____ ?
- A 1-300 cm
 - B 1-500 mm
 - C 10-1000 nm
 - D None of the above
- 14). The diameter of the hair can be measured in terms of _____ meters?
- A 1 mm
 - B <10 nm
 - C 100 micro
 - D None of the above
- 15). The nanostructures are categorized into _____ types according to their dimensions?
- A One
 - B Two
 - C Three
 - D Four
- 16). Which one of the following is an example of zero-dimensional nanostructure?
- A Nanoparticles
 - B Nanorods
 - C Nanotubes
 - D All of the above
- 17). The particle size range of Nano alginate is around _____ nanometers?
- A 1 -2
 - B 4-9
 - C 4.6-9
 - D 53.5-63.1

18). The absorption and adsorption of molecules are slow and low in _____ materials?

- A Nanomaterials
- B Bulk materials
- C Both a and b
- D None of the above

19). Which one of the following is an advantage of nanotechnology?

- A Increased stability
- B Leakage of drug
- C Low solubility
- D All of the above

20). What is the standard form of TEM?

- A Transmission Electron Microscope
- B Transformer Electrode Microscope
- C Transceiver Electrical Microscope
- D None of the above

Section B: Short Answer Questions (40 Marks)

1) Define the following terms (8marks)

- a) (a)Nanomaterial
- b) (b)Nano scale
- c) (c)Nanotechnology
- d) (d)Bio nanotechnology

2) Discuss molecular nanotechnology and its application (8marks)

3) Discuss the following approaches (8marks)

- Bottom approach
- Top down approach

4) Discuss environmental effects of nanomaterial (8marks)

5) Describe the features of nanoparticles and nanomaterial and how they differ from non-Nano levels elements (8marks)

SECTION C: Long Answer Questions (60 Marks)

1. Discuss the effects of nanotechnology (nanomaterial) on the global economy (20 marks)

2. Discuss the applications of nanotechnology (20 marks)

3. Discuss the impact of nanotechnology on the health system and its current trends (20 marks)