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(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS 2022/2023 ACADEMIC YEAR

FOURTH YEAR SECOND SEMESTER MAIN EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE IN MEDICAL BIOTECHNOLOGY

COURSE CODE: BMB 424

COURSE TITLE: NANOTECHNOLOGY

DATE: 24TH APRIL 2023 **TIME: 8.00 – 10.00AM**

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 (20 Marks)

1. Nanobiotechnology deals with materials of the size _____ m.
A. 1 / 100000000
B. 1 / 10000000
C. 1 / 1000000000
D. 1 / 10000000000
2. TEM is _____.
A. Transmission Electron Microscope.
B. Transmit Electron Microscope.
C. Transmission Electrical Microscope.
D. Transmit Electrical Microscope.
3. Which one of the following technology is used in making memory chips?
A. Nano design.
B. Nanofabrication.
C. Microassay.
D. Tissue engineering.
4. The art and science of etching, writing or printing at the microscopic level in the order of nanometer is _____.
A. NEMS.
B. nanolithography.
C. nanofabrication.
D. nano paltcinins.
5. The process used to create topographical features on a surface by selective removal of material by physical or chemical means is called _____.
A. etching.
B. bonding.
C. lithography.
D. writing.
6. The study that involves the behaviour, manipulation and control of fluids that are confined to nanometers is called as _____.
A. nanoarray.
B. nanocapillary.
C. nanofluids.
D. nanomembranes.
7. Expand MRI.
A. Magnetic Resonance Imaging.
B. Molecule Resonance Imaging.
C. both a and b.
D. b alone.
8. A network or circuit of biological neurons is called as _____.
A. neural network.
B. neuron.
C. neuron network.
D. biological network.

9. Artificial neurons were first proposed in 1943 by whom?
A. Warren Mc. Culloch.
B. Walter Pitts.
C. Warren Mc. Culloch and Walter Pitts.
D. Warren and Pitts.
10. Quantum dots are _____ in nature.
A. inorganic.
B. organic.
C. biologic.
D. metallic.
11. What are the approaches used in making nanosystems?
A. Top-down.
B. Bottom-up.
C. Both a and b.
D. Neither a nor b.
12. Ceramic powders find application in _____.
A. pigments.
B. abrasives.
C. catalysts.
D. all the above
13. Nanopowders are defined as powders having an average particle size of less than ____ nm.
A. 100.
B. 1000.
C. 10.
D. 1.
14. The term nanotechnology was first used by _____.
A. Richard Feynman.
B. Norio Taniguichi.
C. Eric Dexler.
D. Karl Peter.
15. Which one of the following techniques is used for the synthesis of 2-D nanostructures?
A. Anisotropic crystal growth.
B. Top up.
C. Bottom down.
D. Both b and c.
16. Nanomembranes have a pore size of _____.
A. 1nm-10nm.
B. 10nm-100nm.
C. 0.1nm-1nm.
D. 100nm-1000nm
17. Silicon or polymer devices that perform non-electronic functions such as sensing and activation are called as _____.
A. microsystems.
B. nanosystems.

C. sensors.
D. smart systems.

18. Microsystems with advanced capabilities and own intelligence are commonly referred to as _____.
A. bio MEMS.
B. MEMS.
C. sensors.
D. smart systems.
19. cDNA is _____.
A. compact DNA.
B. circular DNA.
C. complementary DNA.
D. closed DNA.
20. Which of the following is the biomedical application of quantum dot?
A. LEDs.
B. Solar cells.
C. Qubits.
D. Medical imaging

SECTION B: Short Answer Questions (40 Marks)

1. Describe the unique properties that nanomaterials exhibit compared to bulk materials [5mks]
2. Describe the various methods used in manipulation of matter[5ms]
3. Discuss the speculative dimensionality in nanomaterials Quantum [5mks]
4. Discuss the two main types of nanotechnology synthesis approach [5mks]
5. Name 8 applications of Nanotechnology [5mks]
6. Discuss the disadvantages of bottom –up approach [5mks]
7. Discuss the examples of biomimetic approach [5mks]
8. Discuss the key technological goals of nantechnology in Biomedical research [5mks]

SECTION C: Long Answer Questions (60 Marks)

1. Describe the application of nanotechnology in medicine[20mks]
2. Discuss the environmental concerns over the use of Nanotechnology [20mks]
3. Discusss the current trends of nanotechnology [20 Marks].