50

(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS
MAIN EXAMINATION

UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

FOURTH YEAR SECOND SEMESTER EXAMINATIONS

FOR THE DEGREE
OF
BACHELOR OF SCIENCE IN BIOTECHNOLOGY

COURSE CODE: SBT 423

COURSE TITLE: APPLIED BIOPHYSICS

DATE: FRIDAY, 14TH APRIL 2023 **TIME: 8:00 – 10:00 A.M.**

INSTRUCTIONS TO CANDIDATES

Answer all questions in section A
Answer any TWO questions in section B

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

SHORT ANSWER QUESTIONS [40 MARKS]

1. Biophysics is a reductionist science and is both stochastic and deterministic. Explain. [2 Marks]

2. Outline the major contributions of biophysics to modern biology. [4 Marks]

3. Briefly describe the concept of computational Biophysics and its career paths. [3 Marks]

4. Describe the biophysics principles governing the transmission of a nerve impulse along an axon. [5 Marks]

5. State and explain the SIX (6) fundamental questions of interest that biophysics seek to answer. [5 Marks]

6. Describe the fluid mosaic model of the cell membrane structure and its function. [5 Marks]

7. Describe how the laws and principles of physics describing conductivity in electrical wires can be used to explain normal physiology of the human cardiovascular system. [5 Marks]

8. Discuss how quantum mechanics could be used to explain the process of photosynthesis. [5 Marks]

9. Give a brief overview of a biological neural network and the biophysical principles that may direct it. [3 Marks]

SECTION B: ESSAY QUESTIONS (30 MARKS)

10. Discuss the various medical biophysical techniques that have been used in cancer diagnostics and therapeutics. [15 Marks]

11. Describe the biophysics of the human visual system. [15 Marks]

12. Using appropriate illustrations, discuss the biophysics of hearing and clearly explain how humans perceive sound and achieve balance. [15 Marks]