(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

(MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

MAIN EXAM

2022/2023 ACADEMIC YEAR

FOURTH YEAR FIRST SEMESTER EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE IN EPIDEMIOLOGY AND BIOSTATISTICS

COURSE CODE: HEM 414

COURSE TITLE: BIOASSAYS AND PHARMACOLOGICAL AND INFECTIOUS DISEASE MODELING

DATE: 7/12/2023   TIME: 2.00-4.00 PM

INSTRUCTIONS TO CANDIDATES:
This paper has two sections: Section A and B. Answer all questions in section A and any two questions in section B.

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

Paper Consists of 2 Printed Pages. Please Turn Over

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SECTION A (40 marks): answer all questions in this section

1. Outline four key aspects of pharmacokinetics (4 marks)
2. Describe bioavailability (4 marks)
3. Differentiate between hyperbolic E_{max} model and sigmoidal E_{max} model (4 marks)
4. With the help of a formula, outline parameters of the Bayes' Theorem (4 marks)
5. Draw a curve of a typical concentration-time plot for an orally administered drug with key pharmacokinetic parameters (4 marks)
6. Define the following (4 marks)
   a) Therapeutic window
   b) E_{max}
   c) LD_{50}
   d) Pharmacokinetics
7. Distinguish between deterministic and stochastic models of disease modeling (4 marks)
8. Outline different phases of drug clinical trials (4 marks)

9. According to records from Masinde Muliro University, 1 percent of students Uganda diabetes mellitus. A screening test accurately detects the disease for 95% of the people with it. The test also indicates the disease for 20% of the people without it (false positives). Assuming a student screened for diabetes tests positive, what is the probability that they have it? (4 marks).

10. List four roles played by biostasticians and epidemiologists in drug development (4 marks)

SECTION B (30 marks): answer any two questions in this section

1. Explain the different routes of drug administration indicating advantages and disadvantages of each (15 marks).
2. Write notes on direct, indirect, and sandwich ELISA detection methods (15 marks)
3. Describe compartment model outlining its different forms (15 marks)