(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2023/2024 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER EXAMINATIONS

MAIN EXAMINATION

FOR THE DEGREE OF
BACHELOR OF SCIENCE IN GEOSPATIAL INFORMATION SCIENCE

COURSE CODE: DPE 304

TITLE: GEOSPATIAL DATABASES

DATE: 19/12/2023   **TIME: 8-10AM**

INSTRUCTIONS TO CANDIDATES

This paper contains **four (4)** questions
Question **one (1) is compulsory (30 Marks)**
Attempt **any other two Questions from section II**

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 2 Printed Pages. Please Turn Over →

SECTION I: COMPULSORY {30 MARKS}
QUESTION ONE

a) Using illustrative diagrams, explain how a spatial database system stores Points, Lines and Polygons primitives in;

    i.   Raster data model   [4 Marks]

    ii. Vector data model   [4 Marks]

b) Explain the main characteristics of a spatial database system   [9 Marks]

c) Explain purpose of the following SQL Data Manipulation language commands

    i.   Select   [3 Marks]

    ii. Insert   [3 Marks]

    iii. Update   [3 Marks]

d) State the basic properties that every transaction should have in a DBMS [4 Marks]

SECTION II: ATTEMPT ANY OTHER TWO (2) QUESTIONS {40 MARKS}

QUESTION TWO

a) Based on the American National Standard Institute (ANSI), explain the three levels of Architecture used in the design of spatial database management system

                                                        [9 Marks]

b) State the advantages and disadvantages of storing raster data using

    i. Run length codes   [4 Marks]

    ii. Chain codes   [4 Marks]

c) Define a spatial database system   [3 Marks]

QUESTION THREE

a) Discuss the following data models used in spatial database systems.

    i.   Hierarchical Database Model   [7 Marks]

    ii. Network database Model   [7 Marks]

b) Distinguish between the following commands used to retrieve data in a relational algebra

    i.   Selection and Projection   [3 Marks]

    ii. Cartesian product and set difference   [3 Marks]

QUESTION FOUR

a) Highlight any six functions of a database management system   [6 Marks]

b) Explain the following concepts as used in an Entity relation model

    i.   Entity types   [3 Marks]

    ii. Attributes   [3 Marks]

    iii. Relationship types   [3 Marks]

c) Outline the characteristics of a Relational Database Model   [5 Marks]