MACHAKOS UNIVERSITY

University Examinations for 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR SPECIAL / SUPPLEMENTARY EXAMINATIONS FOR

BACHELOR OF SCIENCE MATHS AND COMPUTER SCIENCE

BACHELOR OF SCIENCE STATISTICS AND PROGRAMMING

BACHELOR OF SCIENCE ELECTRICAL ENGINEERING

BACHELOR OF SCIENCE COMPUTER SCIENCE

SCO206/SIT250/EEE207/SST203: DATABASE SYSTEMS

DATE:28/7/2023   **TIME: 2:00-4:00 PM**

INSTRUCTIONS:

Attempt Question One and Any Other Two questions in this paper

QUESTION ONE (30 MARKS)

a)   Explain how the following database concepts are implemented

   i.   Data availability   (4 marks)

   ii.   Data validation   (4 marks)

   iii.   Data security   (2 marks)

b)   A tennis club uses the following table to record details of players and their coaches.

PlayerID	Name	Ranking	CoachID	CoachName
P001	Kariuki	12	C003	Ben
P002	Okoth	3	C013	Mark
P003	Tanui	17	C003	Ben
P004	Mosioma	9	C006	Titus

   i.   Explain why the above table is not in 3rd normal form.   (4 marks)

   ii.   Transform the table into 3rd normal form.   (6 marks)

c)   The table below records orders for items. Each order is placed on a given date, and may include a variety of items in different quantities.

Orders

OrderNo	ItemNo	Description	Date	Quantity
1	12	Screw	6th jan	100
1	15	bolt	6th jan	50
2	7	Flange	Feb 2nd	10
2	15	Bolt	Feb 2nd	40
2	12	screw	Feb 2nd	80

i.   Give an example of an insertion anomaly and an example of modification (update) anomaly that might occur in the above table.   (4 marks)

ii. Transform the table into 2nd Normal Form   (6 marks)

QUESTION TWO (20 MARKS)

a)   Explain three stages of data base design   (6 marks)

b)   Explain two components of a database   (4 marks)

c)   Distinguish between a distributed database and a distributed database management system.

(4 marks)

d)   Explain three goals of database security.   (6 marks)

QUESTION THREE (20 MARKS)

a)   Describe three integrity constraints that could be applied to a database management system during its design stage.   (6 marks)

b)   Explain two update anomalies associated with poor database design.   (2 marks)

c)   Sharif is a newly recruited database administrator. Explain four roles that he would be expected to perform in his everyday operations   (6 marks)

d)   Describe five advantages of using a database system over the use of spreadsheets. (6 marks)

QUESTION FOUR (20 MARKS)

a) Highlight three characteristics of using a primary key during database design (6 marks)

b) Explain three types of database schema (6 marks)

c) Discuss the role of a database administrator. (8 marks)

QUESTION FIVE (20 MARKS)

a) Describe, using an example, one type of problem that can occur in a multi-user environment when concurrent access to the database is allowed. (10 marks)

b) By using illustrations, state the difference between hierarchical and network database models (10 marks)