



# **MACHAKOS UNIVERSITY**

University Examinations for 2022/2023

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY**

**SECOND YEAR SECOND SEMESTER EXAMINATION FOR**

**BACHELOR SCIENCE (INFORMATION TECHNOLOGY)**

**BACHELOR OF SCIENCE (COMPUTER SCIENCE)**

**SCO304: ADVANCED DATABASE SYSTEMS**

**SIT351: DATABASE IMPLEMENTATION**

**DATE:**

**TIME:**

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**INSTRUCTIONS: Answer Question ONE and other TWO Questions**

**QUESTION ONE (COMPULSORY) (30 MARKS)**

- a) Explain five advantages of database management system over file management system. (5 marks)
- b) Highlight five factors to consider while selecting database management system (5 marks)
- c) Discuss four components of a database environment (4 marks)
- d) Using clear examples, illustrate the application of three sql languages (6 marks)
- e) Illustrate two approaches of updating data in data to a table in Ms. Access (4 marks)
- f) In a transaction, explain three aspects that a DBMS should guarantee with respect to concurrent execution of several transactions and database consistency (6 marks)

## QUESTION TWO (20 MARKS)

- a) Define data normalization and explain why it is important in database design. (4 marks)
- b) Study the following table and answer the questions that follow.

Std_no	Name, Tel_No	Campus, Address , Town	Department	HoD	Office_Tel	Program	Class
401	Jane, 0721545	Main, 45645 Kisii	CIT	Mr. Mwai	53337	Computer science	J17-2022
402	Kamau, 077120	Main, 34242 Keroka	ENG	Mr. Tom	53341	Civil Eng.	J12-2022
403	Kioko,0721125	Main, 56756 Nairobi	CIT	Mr. Mwai	53337	Computer science	J17-2022
404	Lenku, 072564	Town, 3456 Kericho	ENG	Mr. Tom	53352	Civil Eng.	J12-2022
521	Linnet, 0221525	Town, 1112 Makueni	HOSP	Mr. Lewa	53389	Tourism	T12-2022

- i) Normalize the above table to the 3NF (6 marks)
- ii) State the three main differences between 1NF, 2NF and 3NF tables. (3 marks)
- c) Out of the 3NF table(s), generate a SQL script that displays student number, name, campus, department, and class using an equijoin. (7 marks)

## QUESTION THREE (20 MARKS)

- a) Justify the importance of adding indexes in a table (2 marks)
- b) List the four phases involved in query processing (4 marks)
- c) Study the following table and answer the following questions:

P_ID	F_Name	S_Name	P_Category	P_DOB	Tel _Number	M_Status	HomeAddress

Write the SQL script to do the following:

- i) Create the above table (4 marks)
- ii) Inserts these values in the table (1 , John, Peterson, Adult, 12/12/1970, 0111123, Single, 233-2250 Narok) while applying lock to the entire table (3 marks)
- iii) Displays all patients below 18 years (3 marks)
- iv) Adds a constraint to avoid repetition of PatientID (4 marks)

## QUESTION FOUR (20 MARKS)

- a) List four MS access database objects (3 marks)
- b) Justify the importance of a database administrator in an ERP system (4 marks)
- c) Highlight four actions involved in a checkpoint in a database system. (4 marks)
- d) Illustrate four methods applied in ensuring security of a database system (8 marks)

**QUESTION FIVE (20 MARKS)**

- a) Define concurrency in a database transaction (2 marks)
- b) Simulate the following occurrences in a database system.
  - i) Lost Update (4 marks)
  - ii) Uncommitted dependency (4 marks)
  - iii) Inconsistent analysis (4 marks)
- c). Discuss three roles of concurrency control (6 marks)