



MACHAKOS UNIVERSITY

University Examinations for 2022/2023 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (STATISTICS AND PROGRAMMING)

SST 203: DATABASE MANAGEMENT SYSTEMS

DATE: 21/4/2023

TIME: 8:30 – 10:30 AM

INSTRUCTIONS: Answer Question ONE and other TWO Questions

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Explain the following terms as used in database systems:-
- i. Atomicity (2 marks)
 - ii. Aggregation (2 marks)
 - iii. ERD (2 marks)
- b) Define ‘Data Independence’ as used in DBMS (2 marks)
- c) Explain normalization as used in databases systems (3 marks)
- d) Explain TWO types of Data Independence as applied in DBMS (4 marks)
- e) Describe three objectives of the selection of a data type for databases. (6 marks)
- f) Write an SQL SELECT statement to display all the columns of the STUDENT table but only those rows where the Grade column is greater than or equal to 90. (3 marks)
- g) Explain what needs to happen to convert a relation to third normal form (6 marks)

QUESTION TWO (20 MARKS)

- a) Write an SQL SELECT statement to count the number of rows in STUDENT table and display the result with the label NumStudents. (3 marks)
- b) Discuss the alternative terminology that is used in the relational model. (4 marks)
- c) Highlight the steps that should be followed when preparing to create a database table

(8 marks)

- d) In database management systems;
- i. Define domain constraints (1 mark)
 - ii. Describe TWO domain constraints (4 marks)

QUESTION THREE (20 MARKS)

- a) Explain why normalized tables require more complex SQL when SQL statements are used in application programs (4 marks)
- b) Explain four Problems with Traditional File System in Data Management Processing (4 marks)

Study the following database table that stores student's records and answer the questions that follow:-

REG_NO	F_NAME	L_NAME	COURSE	GENDER	D_O_B
1/2016	John	Mutuku	DCS	Male	13/6/1990
2/2016	Steve	kipkorir	DCS	Male	13/3/1985
3/2016	Susan	Mutua	CIT	Female	19/11/1986
4/2016	Steve	Kin'gori	DBIT	Male	1/3/1978

- c) Write the following SQL statements to perform the following
- i) Display all students where the results will only contain the columns REG_NO, L_NAME and F_NAME. (2 marks)
 - ii) To produce the L+NAME and F_NAME combined as Student name (3 marks)
 - iii) To find the details of All male students in the course DCS. (2 marks)
 - iv) To produce the total number of students per course (2 marks)
 - v) Get a list of all the male students born between the year 1980 and 1989. (3 marks)

QUESTION FOUR (20 MARKS)

- a) Define a RDBMS (2 marks)
- b) Describe the difference between homogeneous and heterogeneous distributed database (4 marks)
- c) Explain TWO Applications of Distributed Databases (2 marks)

- d) You have two tables, EMPLOYEE and COMPUTER that are in a one-to-one relationship. The foreign key is EmpNumber in COMPUTER which references EmpNumber as the primary key of EMPLOYEE. Explain what must be done to convert the one-to-one EMPLOYEE-COMPUTER relationship to a one-to-many relationship where one employee can have more than one computer. (6 marks)
- e) Describe THREE Database Integrity rules and provide example for each (6 marks)

QUESTION FIVE (20 MARKS)

- a) Describe THREE important security features of an organizational DBMS (6 marks)
- b) The Database Life Cycle (DBLC) contains six phases, Analyze what happens in phase one. (6 marks)
- c) Discuss FOUR disadvantages of a standard language such as SQL (8 marks)