



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (APPLIED PHYSICS AND TECHNOLOGY)

SIT111: INTRODUCTION TO DATABASES

DATE: 17/6/2021

TIME: 2.00-4.00 PM

INSTRUCTIONS

Answer question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

- a) Differentiate between the following terms in relation to database systems (8 marks)
- i. Data and Database
 - ii. Datum and Information
 - iii. Knowledge and file
 - iv. Database management system and file processing systems
- b) Discuss how the following terms affect database management system. (12 marks)
- i. Atomicity
 - ii. Integrity
 - iii. Isolation
 - iv. Consistency
 - v. Constraints
 - vi. Concurrency
- c) George was employed as a database administrator in a large organization. His first task was to advise the company on which method of data processing to employ. Advise George on five points to convince the management to adopt database management system. (10 marks)

QUESTION TWO (20 MARKS)

- a) As a database administrator, explain the scenarios under which you can use database languages. (6 marks)
- b) List four competencies that a database administrator should possess. (4 marks)
- c) Discuss the three levels of schema architecture. (6 marks)
- d) Differentiate the following (4 marks)
 - i. Logical and physical data independence
 - ii. Single user and multi user systems.

QUESTION THREE (20 MARKS)

- a) Outline the five steps followed in database design (5 marks)
- b) Using an appropriate example, illustrate the concept of entity relationship model in one to one and one to many scenarios. (6 marks)
- c) Describe the following concepts as relates to relational model
 - i. Domain (2 marks)
 - ii. Attribute (2 marks)
 - iii. Schema (2 marks)
- d) Differentiate between primary key, candidate key and foreign key. (3 marks)

QUESTION FOUR (20 MARKS)

- a) Study the following table and answer the following questions:

S-no.	FirstName	SecondName	DateOfBirth	Gender	MaritalStatus

Create the SQL script to do the following:

- i. Create the above table (4 marks)
- ii. Inserts this values in the table (1, John, Kimani, 12/12/2000, Male, Single) (3 marks)
- iii. Displays all singles in the table (3 marks)
- iv. Adds a constraint to avoid repetition of S-no (4 marks)
- b) Justify the significance of adding indexes in a table (2 marks)
- c) List the four phases involved in query processing (4 marks)

QUESTION FIVE (20 MARKS)

- a) Define a transaction as applied in a database system (2 marks)
- b) List the four ACID properties of a transaction. (4 marks)
- c) What is data concurrency control (2 marks)
- d) In your understanding discuss two reasons why you would allow concurrency in a database system (4 marks)
- e) Highlight four database recovery concepts you would apply to secure data against database or transaction loss. (8 marks)