



# MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (STATISTICS AND PROGRAMMING)

SST 202: DATABASE SYSTEMS

DATE: 2/5/2019

TIME: 2.00-4.00 PM

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## INSTRUCTIONS

Answer **question ONE** and any other **TWO** questions.

### QUESTION ONE (30 MARKS) (COMPULSORY)

- a) Distinguish between a field and a record in database systems (4 marks)
- b) Explain two factors to consider for selecting a database management system. (4 marks)
- c) Give the difference between delete anomaly and update anomaly. (4 marks)
- d) Explain the following database concepts
  - i. OLTP
  - ii. OLAP (4 marks)
- e) Briefly describe three possible attacks to a database system (6 marks)
- f) Draw an Entity Relationship Diagram for MU that captures the following entities: Students, Lecturers, Library and Computer Lab. Include 2 attributes for each entity. (4 marks)
- g) State Four categories of database users. (4 marks)

### **QUESTION TWO (20 MARKS)**

- a) James wants to design tables to be used in a given database. Using well labelled diagrams explain three types of entity relationships that he can use in the design. (9 marks)
- b) Models are used to represent the architecture of various systems. Briefly explain four types of database models that can be implemented in database design. (8 marks)
- c) State three advantages of normalizing a database. (3 marks)

### **QUESTION THREE (20 MARKS)**

- a) Show, giving appropriate SQL commands, step by \_step how you would go about the following tasks:
  - i. Create a database called Macha Uni. (2 marks)
  - ii. Select the database above and create a table called Staff with five fields. Include the appropriate data types, primary key and other attributes. (5 marks)
  - iii. Add two records in the table. (4 marks)
  - iv. Select all Female Lecturers in ICT department (4 marks)
- b) James wants to develop a database for a given set up. State all the steps in the database development cycle that he is supposed to follow. (5 marks)

### **QUESTION FOUR (20 MARKS)**

- a) Discuss three components of a database system. (6 marks)
- b) Explain four file organization methods that can be used in databases. (8 marks)
- c) Erick, a database administrator is supposed to protect the database from various threats. Advise him on three methods he can use to perform this task. (6 marks)

### **QUESTION FIVE (20 MARKS)**

- a) Distinguish between the following:
  - i. Primary key and foreign key
  - ii. Inner join and right join (8 marks)
- b) Explain three types of data schema used in databases (6 marks)
- c) Discuss three constraints that can be used in database tables (6 marks)