



**JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY
UNIVERSITY EXAMINATIONS 2016/2017
FIRST YEAR SECOND SEMESTER EXAMINATIONS FOR THE DEGREES
OF
BACHELOR OF SCIENCE IN ACTUARIAL SCIENCE, BIostatISTICS
FINANCIAL ENGINEERING, OPERATION RESEARCH AND STATISTICS
STA 2107: DATABASE MANAGEMENT SYSTEMS.**

DATE: JUNE 2017

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

- 1. Answer questions ONE (section A) and any two questions in section B*
- 2. Be neat and show all your workings*
- 3. All questions except question one carry equal marks*

This paper consists of 3 printed pages
STACS Examination board 2016/2017

SECTION A (30 MARKS)

QUESTION ONE

a) Discuss the concepts of database systems and explain the main functions. (5 Marks)

b) To illustrate the concept of a transaction, consider a banking database. When a bank customer transfers money from a savings account 3208 to a checking account 3209, the transaction can consist of three separate operations:

- Decrement the savings account 3208
- Increment the checking account 3209
- Record the transaction in the transaction journal

Write SQL statements that would execute the three transactions.

(6 Marks)

c) Discuss the following:

i. Recovery Data.

(4 Marks)

ii. Concurrent Updates.

(4 Marks)

d) Outline the difference between Data Definition Language (DDL) and Data manipulation Language (DML) and give examples of their functions. (6 marks)

e) Write the SQL statements (code) that you would use to produce a report of students who were born on or after January first 1980 and are married. (5 Marks)

SECTION B (20 MARKS EACH)

QUESTION TWO

a) Discuss the entity-relationship diagram (ERD) concept and draw one that would represent the following relationship. A customer places an order.

- i. A sales rep *serves* a customer.
- ii. A order *contains* a product.
- iii. A warehouse *stores* a product.

(6 marks)

b) Discuss Database concurrency control concept in a distributed database system. (6marks)

c) Discuss the term Data integrity and give examples. (4marks).

d) Explain the purpose of data Normalization. (4marks).

QUESTION THREE

a) Give a SQL statement (code) that would define the structure of the students table in a STACS database system with the following attributes. Student's first and last names, date of

- birth, registration number, gender, the student's program and include the primary. All the attributes are mandatory. Limit the characters and numbers to 20. (5 Marks)
- b) Discuss the concept of (Relational Database Management System) with the help of a suitable diagram. (6 marks)
- c) Explain the followings:
- i. Atomicity. (3 Marks)
 - ii. SQL (2 Marks)
 - iii. Hierarchical data model. (4 Marks)

QUESTION FOUR

- a) Security is the prevention of unauthorized users accessing the database. DBMS uses features such as encryption, authentication, authorization and views to provide security to the database. Discuss the concepts of the mentioned mechanisms. (6 Marks)
- b) Discuss the concept of foreign key explaining it's functions. (4 Marks)
- c) Discuss the terms Database system outlining the levels of abstraction architecture. (6 marks)
- d) State and explain the Properties of Relational Tables. (4 marks)

THE END