

MACHAKOS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT: CIT
UNIT NAME: DATABASE ADMINISTRATION
UNIT CODE: SIT 301
SEMESTER:

DATE:

TIME: 2 HOURS

INSTRUCTIONS: **Answer Question ONE and Any Other TWO Questions.**

QUESTION ONE [30 MARKS]

- a) Explain the following types of functional dependencies in normalization;
 - i) Partial dependency (2 marks)
 - ii) Transitive dependency (2 marks)
- b) Discuss any three database basic recovery facilities used in the restoration of a database in case of a failure (6 marks)
- c) Explain the meaning of transaction in database administration (2 marks)
- d) Explain the SQL syntax of ;
 - i) CREATE TABLE (2 marks)
 - ii) UPDTE record (2 marks)
- e) Describe two types of database security features provided by DBMS (4 marks)
- f) Describe the following database design processes;
 - i) Physical design (3 marks)
 - ii) Logical design (3 marks)
- g) Explain the difference between a data administrator and database administrator (4 marks)

QUESTION TWO [20 MARKS]

- (a) Illustrate the structure of a typical DMBs based on the relational data model [5 marks]
- (b) Explain briefly the five major components of the database system environment [5 marks]
- (c) Explain the following categories of SQL functions;
 - i) Data Definition Language (DDL) (2 marks)
 - ii) Data Manipulation Language (DML) (2 marks)
- (d) Describe the following types of attributes in ER modeling and give an example for each.

- i. Primary key (3 Marks)
- ii. Candidate key (3 Marks)

QUESTION THREE [20 MARKS]

- (a) Enumerate the key roles of a data administrator [6 marks]
- (b) With an aid of a state transition diagram, outline the states for transaction execution in a transaction processing. [6 marks]
- (c) Distinguish between the following in relation to database architecture.
 - i. decentralized database vs Distributed database [4 marks]
 - ii. Client-server database vs Parallel database [4 marks]

and distributed database systems

QUESTION FOUR [20 MARKS]

- (a)
 - (i) Explain the concept of transaction in relation to DBMS [2 marks]
 - (ii) Discuss Three cases that may causes a transaction to fail [6 marks]
- (b) Explain four limitations of file based systems that gave rise to the database system. [4 marks]
- (c) Describe the ACID transaction properties (6 marks)
- (d) Give two examples of database threats and the possible impacts they may have on the database. (2 marks)

QUESTION FIVE [20 MARKS]

- (a) With an aid of an example explain the purpose of Concurrency Control in database administration. [6 marks]
- (b) Giving example in each case, explain the following relational algebra operators as used in DBMS. [6 marks]
 - i. **project:** Π
 - ii. **select:** σ
 - iii. **union:** $\cup$
- (c) One of the functions of a DBA is administration and management of physical database. Describe the areas of concern as far as administration and management of the physical database that the DBA carries out [8 marks]