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:** $\prod$
    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]