(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2016/2017 ACADEMIC YEAR
Supplimentary Exam

END OF SEMESTER EXAMINATIONS
YEAR ONE SEMESTER ONE EXAMINATIONS

FOR THE DEGREE OF MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

COURSE CODE : **MIT 810**

COURSE TITLE : **DATABASE MANAGEMENT SYSTEMS AND INFORMATION MODELING**

DATE: 30/09/2017 **TIME:** **02:00 PM – 05:00 PM**

INSTRUCTIONS TO CANDIDATES

Answer Questions ONE and ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [20 MARKS]

a) Explain the following :   [10 marks]
   i.   Database
   ii. Database management system (DBMS)
   iii. Database Schema
   iv. Metadata
   v.   Data Model

b) Differentiate between Logical Data Independence and Physical Data Independence   [6 marks]

c) State at least four characteristics of DBMS   [4 marks]

QUESTION TWO [20 MARKS]

a) File Organization defines how file records are mapped onto disk blocks. Explain four types of file organization   [12 marks]

b) Discuss different techniques used in data structuring in database   [8 marks]

QUESTION THREE [20 MARKS]

a) Discuss in details the following DBMSs
   i) Relational Database Model and Object -relational model [10 marks]
   ii) Centralized and distributed database [10 marks]

QUESTION FOUR [20 MARKS]

a) With the help of a diagram, describe the Three- Schema Architecture   [10 marks]

b) Explain any five current and emerging research areas in the field of DBMS and information modeling.   [10 marks]

QUESTION FIVE [20 MARKS]

a) The following relation schema can be used to register information on the repayments on micro loans

Repayment(borrower_id,name,address,loanamount,requestdate,repayment_date,request_amount)

A borrower is identified with an unique borrower_id , and has only one address. Borrowers can have multiple simultaneous loans, but they always have different request dates. The borrower can make multiple repayments on the same day, but not more than one repayment per loan per day. Make the normalization to BCNF. State for every step in the normalization, which functional dependency that causes it.

[7 marks]

b) With the help of a diagram, explain different states of transaction in a database. [7 marks]

χ) In a multiprogramming environment where multiple transactions can be executed simultaneously, it is highly important to control the concurrency of transactions. Briefly explain two categories of concurrency control protocols to ensure atomicity, isolation, and serializability of concurrent transactions.

[6 marks]