(KNOWLEDGE FOR DEVELOPMENT)

KIBABII UNIVERSITY

(KIBU)

UNIVERSITY EXAMINATIONS

2020/2021 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS

FIRST YEAR FIRST SEMESTER

FOR MASTER OF SCIENCE DEGREE IN

(INFORMATION TECHNOLOGY)

COURSE CODE: MIT 810

COURSE TITLE: DATABASE MANAGEMENT SYSTEM AND INFORMATION MODELLING

DATE: 30/07 2021 TIME: 9.00AM- 12.00 NOON

INSTRUCTIONS

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [20 MARKS]

a. Discuss the concept behind data independence and explain its importance in a database environment [4 Marks]

b. Explain the difference between a relational database and an object-oriented database [2 Marks]

c. Briefly discuss the data processing procedure in a file system and list problems associated with it [6 Marks]

d. Discuss the major integrity constraints that must be considered when developing a database. [4 Marks]

e. Mr. Smith (a business man) was withdrawing Ksh. 40,000.00 using an ATM. After keying in all the information and instructing the machine on the amount the machine proceeded and prompted him to take his card and immediately the power went off and so the machine without him getting the money. Suppose the condition was to prevail for the next one week, what advice will you give to Smith concerning transactions [4 Marks]

QUESTION TWO [20 MARK

a. Describe **SIX** security measures intended to counter database security threats [6 Marks]

b. Transaction management deals with the problem of always keeping the database in a consistent state .In doing so, a transaction must always maintain four properties. Describe the properties of a transaction. [8 Marks]

c. Describe the three phases of database design [6 Marks]

QUESTION THREE [20 MAR

a. Data abstraction is the process of hiding irrelevant details from user. Describe the three levels of data abstraction [9 Marks]

b. Explain how client/server supports the concept of distributed databases [6 Marks]

c. Failure of processes in a database can be detrimental to an organization. Explain causes of failure in database processes [5 Marks]

QUESTION FOUR [20 MA

a. Consider the CUSTOMER relation with the following attributes:

- CustomerId
- Name
- Address
- City
- Age

Write SQL statements to perform the following transactions;

i) Create the relation [2 Marks]

ii) Return details of all customers aged below 30 years who reside in Nairobi city [2 Marks]

iii) Insert the data (5001, Mary, Box 56 Machakos, Machakos and 34 years) into the respective columns [2 Marks]

iv) Amend the city data from 'Machakos' to 'Mombasa' for a Customer Id '5001' [2 Marks]

v) Empty the CUSTOMER relation of all data [2 Marks]

b. Database system development follows a well-defined process. Describe the systematic development of a database system [10 Marks]

QUESTION FIVE **[20 MARKS]**

a. Explain the difference between a candidate key and the primary key for a given relation [2 Marks]

b. The university wants to develop a database to manage the examinations. The database need to capture the following information: Student details including: Registration number, name, year of study, programme. Each student is identified by Registration number. Programe details including: programme Code, period the programme takes, amount of fee payable every semester. Each programme is identified by programme Code. Each programme has a collection of course units each student enrolled in need to take. Course details to be captured include: course code, course Title, number of credit hours and the programme in which the course belongs. Programmes are created by departments. Department details include: department Code, name and the Faculty in which the department belongs. Course units are classified in semesters. Semester details including: semester ID and semester name. Upon setting an exam, the following exam details are captured: Registration number, course Code, scores. You are hired do design the database for the university:

i. Identify all possible concepts that will form entities [6 marks]

ii. Using appropriate notation, design the ER- diagram for the scenario. Be sure to indicate all key and cardinality constraints. [12 marks]