(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: 28/05/2021   TIME: 9.00 A.M. – 11.00 A.M.

INSTRUCTIONS

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE [20 MARKS]

a. Explain the difference between a relational database and an object-oriented database

[2 Marks]

b. Mr. Brown (a business man) was withdrawing Ksh. 100,000.00 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]

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

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

e. Describe how client/server supports the concept of distributed databases **[6 Marks]**

QUESTION TWO [20 MARKS]

a. Briefly discuss the data processing procedure in a file system and list problems associated with it **[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 MARKS]

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

b. Explain how locking and timestamping concurrency control techniques allow transactions to execute safely in parallel **[6 Marks]**

c. Describe five security measures intended to counter database security threats **[5 Marks]**

QUESTION FOUR [20 MARKS]

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

b. A schema defined for Employee Management System is:

Employee: EmpID, Name, Address, Department, Designation, Salary

Department: DepartID, DepartName, HeadID

Write SQL statement for the following:

    i. Retrieve the details of employee who gets the minimum salary. **[3 marks]**

ii.   List names of all employee who earn more than KSH. 50,000   [3 marks]

iii. Give the name of the employee who heads the department where employee with EmpID 5 works.   [4 marks]

QUESTION FIVE [20 MARKS]

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

b. An application models soccer teams, the games they play, and the players in each team. There is a set of teams, each team has an ID, name, main stadium, and to which city this team belongs. Each team has many players, and each player belongs to one team. Each player has a player number, name, DoB, start year, and shirt number that he uses. Teams play matches and, in each match, there is a host team and a guest team. For each match the following needs to be kept track of: the date on which the game is played, the final result of the match and the players participated in the match. Each match has exactly three referees. For each referee there is an ID, name, DoB, years of experience.

i.   Identify the main entity types and the attributes   [4 Marks]

ii.   Identify the main relationship types and specify the mulplicity for each relationship where necessary.   [3 Marks]

iii. Using your answers for (i) and (ii), draw a single entity relationship diagram to represent the data requirements for the company   [8 Marks]