



**KIBABII UNIVERSITY**

**UNIVERSITY EXAMINATIONS  
2021/2022 ACADEMIC YEAR**

**END OF SEMESTER EXAMINATIONS  
YEAR TWO SEMESTER TWO EXAMINATIONS**

**FOR THE DEGREE IN  
COMPUTER SCIENCE**

**COURSE CODE : CSC 221**  
**COURSE TITLE : DATABASE SYSTEM 1**

**DATE: 11/5/2022 TIME: 02.00 P.M – 04.00 P.M**

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**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTIONS ONE AND ANY OTHER TWO.**

### QUESTION ONE (COMPULSORY) [30 MARKS]

- a) Define the data abstraction as used in database management systems. [2 Marks]
- b) Briefly explain the four trends in database technology [4 Marks]
- c) Study the following narrative and use it to answer the question that follows:

A student must be enrolled on only one course and a course must have students enrolled on it. Each course is identified by a deptID, CourseID, and courseName. Each course must have a number of modules and a module must be part of atleast one course. A module is identified by ModuleID. ModuleName must have a lecturer as a subject leader but a lecturer may not necessarily be a subject leader or may lead more than one module

Draw the entity relationship diagram showing cardinalities and optionality [8 Marks]

- d) With the aid of an example in each case, distinguish between physical and logical data independence as used in database design. [4 Marks]
- e) Describe any six components of a database management system outlining their specific roles. [6 Marks]
- f) Mwaziri intends to design an Entity relationship diagram for a proposed database system outline six procedures guidelines that with enable him meet his objectives. [6 marks]

### QUESTION TWO [20 MARKS]

- a) Briefly explain the six objectives of the three level architecture in implementing database systems [8 Marks]
- b) Explain two functions of a system analyst during database development [2 Marks]
- c) Describe each of the following criteria for classification of database management systems
  - i. Based on data models [2 Marks]
  - ii. Based on the number of users [2 Marks]
  - iii. Based on database distribution [2 Marks]
- d) State two differences between the file based approach and the database approach [4 Marks]

### QUESTION THREE [20 MARKS]

- a) Explain the role of an entity relation diagram in database design. [2 Marks]
- b) Distinguish between a schema and an instance as used in database system [3 Marks]
- c) With the aid of an example in each case, describe each of the following attributes as used in databases
  - i. MultiValued [2 Marks]
  - ii. Composite [2 Marks]
  - iii. Derived [2 Marks]
- d) With the aid of a diagram, describe the three schema database architectures [9 marks]

### QUESTION FOUR [20 MARKS]

- a) A programmer opted to create an application that used file system as a means of storing data.  
Explain **six** challenges that the system is likely to experience from using this approach [6 Marks]
- b) Describe a relational database management system [2 marks]
- c) List six examples database management systems available in the market [3 marks]
- d) Explain the following terms [5 Marks]
  - i. Database
  - ii. Field
  - iii. Record
  - iv. Instance
  - v. Schema
- e) Explain two circumstances that would make an organization to implement a client server database architecture [4 Marks]



### QUESTION FIVE [20 MARKS]

- a) Define the following terms: [5 Marks]
- i. Databases
  - ii. Database Management
  - iii. Data Model
- b) Briefly explain any five applications of database systems. [5 Marks]
- c) Using a diagram, explain the 3-tier database architecture outlining its benefits [5 Marks]
- d) Discuss briefly with the aid of diagrams the shapes used to represent the various objects in an entity relationship diagram. [5 Marks]