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**KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR**  
**FIRST YEAR, SECOND SEMESTER EXAMINATION**  
**FOR THE DIPLOMA IN BUSINESS INFORMATION C TECHNOLOGY**  
**DIT 1007 – DATABASE MANAGEMENT SYSTEMS**

Date: 11<sup>TH</sup> APRIL 2022  
Time: 2:30PM – 4:30PM

**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE (30 MARKS)**

- a) Define the following terms as used in databases (4 Marks)
  - i. A database model
  - ii. Logical Data independence
  - iii. Domain
  - iv. Database management system
- b) Analyze any three components of an ER model giving examples (6 Marks)
- c) i. Briefly explain the advantages of normalization (4 Marks)  
ii. Elaborate any three anomalies in the database (6 Marks)
- d) Describe the main controls that an organization can use to counter database security threats (4 Marks)
- e) Given the two entity sets, A and B, discuss the THREE types of relationship cardinality (6 Marks)

**QUESTION TWO (20 MARKS)**

- a) Differentiate between the database approach and the file-based approach (6 Marks)
- b) Describe the three-schema architecture, outlining the different mappings between the schema levels (6 Marks)
- c) In a relational database management system, SQL statements can be grouped under the following categories, for each of the following explain their purpose giving examples (8 Marks)
  - i. DDL
  - ii. DML
  - iii. DCL
  - iv. TCL

**QUESTION THREE (20 MARKS)**

- a) Describe the following attributes of ER – model (6 Marks)
  - i. Simple versus composite
  - ii. Single-valued versus multivalued
  - iii. Stored versus derived
- b) Differentiate between a database and database management system. (2 Marks)
- c) Explain four features of database systems that have helped in resolving file-based systems (8 Marks)
- d) Describe briefly any two data models. (4 Marks)
  - i. Network data model
  - ii. Relational data model
  - iii. Hierarchical data model

**QUESTION FOUR (20 MARKS)**

- a) Explain five components of a database system environment (10 Marks)
- b) A professor teaches zero, one, or many classes, and a class is taught by one professor. A course may generate zero, one or many classes, and a class comes from one course. A class is held in one room but a room has many classes. Design an ER diagram for the above scenario. (7 Marks)
- c) Convert the ER diagram (b) above to a table with fields for the respective entities (3 Marks)

**QUESTION FIVE (20 MARKS)**

The following Employee table was extracted from the Marimba database.

Employee_No	Employee_Name	Position	Department_Name	Hourly_Rate
101	A Smith	Programmer	IT	22
103	L Janet	Accountant	Pensions	19
110	P Leo	System Admin	IT	21
111	B Jones	Trainer	IT	22
113	W Mercy	Business Analyst	IT	18
102	T George	DBA	Database	26
210	W Richi	A/C Assistant	Finance	17
312	S Gibe	Data clerk	Database	23
211	P Lee	Security-Officer	IT	18

Write SQL statements to:

- i. Create the database and table above (6 Marks)
- ii. Add the first record to table (3 Marks)
- iii. Delete the last two employees (4 Marks)
- iv. Display names and departments of the five least expensive employees (4 Marks)
- v. Extract only employees in the IT department (3 Marks)