THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

MAIN EXAMINATION

JANUARY – APRIL 2022

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

REGULAR PROGRAMME

CMT 109: DATABASE SYSTEMS

Date: APRIL 2022	Duration: 2 Hours
INSTRUCTIONS: Answer Question ONE and any TWO Questions	

Q1. a. Define the following terms; tuple, Unstructured Data, Cardinality, Semantic Integrity Constraints and Data Model.

b. What are the two types of database views?   Briefly explain them.   **(4 Marks)**

c. Briefly explain two characteristics of Relations.   **(4 Marks)**

d. Enumerate any six database applications.   **(3 Marks)**

d. Briefly explain two types of inference attacks in a database.   **(4 Marks)**

e. i. SQL allows duplicates in relations as well as in query results. How does one force the elimination of duplicates in an SQL query?   **(2 Marks)**

ii. Write an SQL Statement where there are so many lecturers but you want to avoid duplicates in the relation.   **(2 Marks)**

f. Describe the three-tier database architecture?   **(6 Marks)**

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SECTION B

Q2. a. Briefly explain any five components of the database environment.   **(5 Marks)**

b. i. Differentiate between External-Conceptual Mapping and Conceptual-Internal Mapping.   **(4 Marks)**

ii. Give an example of each.   **(2 Marks)**

c. Discuss the three phases of relational data model.   **(6 Marks)**

d. Explain the components of a Database Engine.   **(3 Marks)**

Q3.a. What are any five domain types in SQL?   **(5 Marks)**

b. Create a conceptual, physical and logical schema for a university database for students, courses and enrolled students.   **(6 Marks)**

c. Create a View **marksView** from multiple tables **Studentdetails** and **StudentMarks**.
                                                                                                  (4 Marks)
   ;

d. Describe the components of a Data Warehouse.   **(5 Marks)**

Q4. a. Briefly explain three main types of constraints in the relational model.**(6 Marks)**
   ■ There are three *main types* of constraints in the relational model:
       ■ **Key** constraints
       ■ **Entity integrity** constraints
       ■ **Referential integrity** constraints

b. Discuss three database trends.   **(6 marks)**
c. Differentiate between Logical and Physical Data Independence.   **(4 Marks)**
                                            .   **(4 Marks)**

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Q5.a. Explain the Three-Valued logic using the value *unknown*.   (6 Marks)

b. What is the two main goals of data modeling?   **(4 Marks)**

c. What are the five conditions to be satisfied before one can update a view?
                                                                (5 Marks)

d. In case of integrity violation, several actions can be taken. What are any five?
                                                                (5 Marks)

END

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