

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS**

**CHUKA / EMBU**

**EXAMINATION FOR THE AWARD OF  
DIPLOMA IN COMPUTER SCIENCE**

**COSC 0150: DATABASE SYSTEM 1**

**STREAMS: DIP COMP SCI Y1S2**

**TIME: 2 HOURS**

**DAY/DATE: TUESDAY 6 /07/ 2021**

**8.30 AM – 10.30 AM**

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**INSTRUCTIONS:**

- Answer question **ONE** and **TWO** other questions
- Do not write anything on the question paper
- This is a **closed book exam**, No reference materials are allowed in the examination room
- There will be **NO** use of mobile phones or any other unauthorized materials
- Write your answers legibly and use your time wisely.
- Marks are awarded for clear and concise answers.

**SECTION A (Answer ALL questions in this section)**

**QUESTION ONE [30 MARKS]**

- a) Define the following terms
- Transaction [2 marks]
  - Relation [2 marks]
  - Database management system [2 marks]
  - Degree of Relationship [2 marks]
- b) Differentiate between database schema and database instance [4 marks]
- c) Explain three reasons why Keys are required in databases [3marks]

- d) Differentiate between the sparse index and dense index as used in ordered indexing [4 marks]
- e) Discuss Data Manipulation language as used in SQL Stating at least TWO commands [3 marks]
- f) Discuss TWO constraints that can be applied to a table in a database [4 marks]
- g) State TWO differences between foreign key and primary keys in a database [4 marks]

**SECTION B ( Answer TWO questions in this section)**

**QUESTION TWO [ 30 MARKS]**

- a) Discuss THREE types of attributes an entity can have [6 marks]
- b) Explain the distinctions among the terms primary key, candidate key, and super key [4marks]
- c) Given student, lecturer and department as entities with the following attributes  
Student: name, registration number and course  
Lecturer: staff\_number, phone\_number  
Department: dept\_id, dept\_name
- i. Represent each entity depicting the attributes [6 marks]
- ii. The relationship between the entities are as follows  
Many students belong to a single department  
Several lecturers belong to one department  
One lecturer teaches many students
- iii. Draw the Entity-Relationship diagram (ER) [4 marks]

**QUESTION THREE [ 20 MARKS]**

- a) Discuss the three-level architectural diagram of a database [6 marks]
- b) Discuss data definition language (DDL) in SQL and give three commands used [4 marks]

- c) Define database indexing as used in DBMS [2 marks]
- d) Discuss the ACID properties of transactions [8 marks]

**QUESTION FOUR [ 20 MARKS]**

- a) Discuss the use of database systems in the following sectors [10 marks]
  - i. Universities
  - ii. Finance
  - iii. Manufacturing
  - iv. Banking
  - v. Telecommunication
- b) Differentiate a composite key from a compound key as used in database [4 marks]
- c) Discuss THREE categories of data integrity in DBMS [6 marks]

**QUESTION FIVE [ 20 MARKS]**

- a) Discuss the function of the following SQL commands [4 marks]
  - i. GRANT
  - ii. REVOKE
- b) Discuss the THREE types of DBMS architecture [6 marks]
- c) Data independence can be subdivided into two categories; discuss them [4 marks]
- d) Write an SQL statement to create the table below [6 marks]

Attributes	Data types
Subject_id (primary key)	Integer
Student_id	integer
Subject_name	Varchar
semester	Integer
teacher	Varchar

