CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF DIPLOMA IN COMPUTER SCIENCE

COSC 0150: DATABASE SYSTEMS 1

STREAMS: **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 12/04/2023 **2.30 P.M – 4.30 P.M**

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.

QUESTION ONE [30 MARKS] COMPULSORY

a) Define the following terms

i. Database management system (2 marks)

ii. Database schema (2 marks)

iii. Participation Constraint (2 marks)

b) With the aid of examples in each case, distinguish between Data Definition Language (DDL) and Data Manipulation Language (DML) (4 marks)

c) Outline **three** uses of database system in Telecommunication Industry (3 marks)

d) Explain **four** limitations of the file-based approach (4 marks)

e) Highlight **three** functions of Database Administrator in a database environment (3 marks)

f) Define the term server as used in client-server database (2 marks)

g) Outline the function of each of the following constraints as used in SQL

i. UNIQUE (2 marks)

ii. CHECK (2 marks)

h) With the aid of well-illustrated example in each case, Distinguish between sparse and dense index in database indexing (4 marks)

SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION TWO [20 MARKS]

a) Table 1 is a structure of a table named student_details in a student database. Use it to answer the questions that follow

Field	**Description**
Regno	Int(10)
SName	Varchar(20)
Location	Varchar(25)

Table 1

Write an SQL statement to perform each of the following

i. Create the table (4 marks)
ii. Rename the field named *Regno* to *registration number* (3 marks)
iii. Add a field named *course* having a *varchar* datatype (3 marks)
iv. Remove the field named *Location* (2 marks)
v. Remove the table (2 marks)

b) Bilk dairy limited, a company that manufactures and distributes dairy products to different parts of Nairobi County, uses a traditional file-based system in its operations. Explain any **three** challenges the company could be facing (6 marks)

QUESTION THREE [20 MARKS

a) Distinguish between *domain constraint* and *referential integrity* as used in database design (4 marks)

b) Discuss **two** ACID properties of a transaction (4 marks)

c) The main objective of the THREE LEVEL ANSI-SPARC database architecture is to achieve data abstraction in a database system.

i. With the aid of a well labelled diagram, discuss the THREE LEVEL ANSI-SPARC database architecture highlighting the kind of information dealt with at each level [8 marks]

ii. State **four** advantages of following the above architecture when developing a database system [4 marks]

QUESTION FOUR [20 MARKS]

a) In a college, a student is identified by admission number, names, which consists of first and second name, phone number, date of birth, and age which is derived from date of birth. Each student belongs to a class, which is identified by class code and name. Students are free to register in one or more clubs. Each club is identified by a club name and club identification code. Represent the information using an entity relationship diagram. (8 marks)

b) John has been tasked to design a database by following the database design life cycle. Explain to John each stage of this cycle (12 marks)

QUESTION FIVE [20 MARKS]

a) State and explain **four** components of database management system (8 marks)

b) Table 2 is a table named Results in a database. Use it to answer the questions that follow.

Firstname	**Lastname**	**IDNo**	**DOB**	**Marks**
John	Wesley	24562456	12-04-1996	78
Alice	Wallace	14521452	01-08-1998	52
Mark	Okoyo	85796452	18-04-2002	90
Mary	Quills	45784587	02-12-2000	69

Table 2

Write SQL statements to perform each of the following

i. Insert the first record of the table (2 marks)

ii. Display *Firstname, lastname IDNo* and *Marks* for all students whose marks range from 60 to 80 (3 marks)

iii. Display the *DOB* value for *Mark Okoyo* (2 marks)

iv. Sort all the records from highest to lowest based on *Marks* (3 marks)

v. Display all the records for students whose *Firstname* start with letter *M* (2 marks)
