



# UNIVERSITY EXAMINATIONS

**SECOND SEMESTER 2023/2024 ACADEMIC YEAR**

**SECOND YEAR EXAMINATION FOR THE DEGREE  
OF BACHELOR OF SCIENCE (STATISTICS)**

**COMP 209: DATABASE MANAGEMENT SYSTEMS**

***STREAM: R***

***TIME: 2 HRS***

***DAY: TUESDAY [11.30A.M – 1.30P.M]      DATE: 16/04/2024***

**THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES**

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***Vision : A University for Valued Transformation of Society***

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**INSTRUCTIONS**

- Answer **ALL** questions in section A and any **TWO** questions in section B
- All questions in section B carry equal marks

**SECTION A (30 MARKS)****QUESTION ONE (30 MARKS)**

- a) Discuss about the following relational set operators **(6 Marks)**
- Cartesian product
  - Set difference
  - Select
- b) Describe any three functions of a database administrator **(3 Marks)**
- c) Outline three areas where databases are mostly used. **(3 Marks)**
- d) Explain the function of each of the clauses in an SQL statement: **(5 Marks)**
- WHERE
  - GROUP BY
  - HAVING
  - SELECT
  - ORDER BY
- e) Explain the network data model. **(4 Marks)**
- f) Discuss any three major drawbacks associated with file-based system of data storage. **(3 Marks)**
- g) Explain the three data anomalies in databases with examples. **(6 Marks)**



**SECTION B EACH QUESTION IS WORTH 20 MARKS ANSWER ANY TWO QUESTIONS IN THIS SECTION.**

**QUESTION TWO (20 MARKS)**

- a) Explain the following keys and give examples to illustrate. **(6 Marks)**
- a. Primary Key
  - b. Foreign Key
  - c. Candidate Key
- b) Constraints are key to ensuring referential integrity of your data in the database, using SQL statement(s) show how you would apply **THREE** kinds of constraints when creating a database object. **(6 Marks)**
- c) Outline four advantages and two disadvantages of a database system. **(6 Marks)**
- d) State any **TWO** properties of a relation in a relational DBMS. **(2 Marks)**

**QUESTION THREE (20 MARKS)**

- a) With the aid of a diagram , describe the **three** level database architectures.**(8 Marks)**
- b) Distinguish between *data manipulation language* and *transaction control language* as languages used in Structured Query Language. **(4 Marks)**
- c) Under what circumstance would each of the following joins be used in relational databases?
- i. Left join **(2 Marks)**
  - ii. Equi join **(2 Marks)**
- d) With the aid of an example in each case, describe each of the following attributes as used in databases.
- i. Multi valued attribute **(2 Marks)**
  - ii. Derived attribute **(2 Marks)**



**QUESTION FOUR (20 MARKS)**

- a) Consider the following table structures:

Table 1: Employee

<u>Employee ID</u>	FirstName	MiddleName	LastName	Department	Year	Month	Gender
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Table 2: Accounts

<u>Payroll No</u>	Employee_ID	Salary	Advance_Paid	Balance
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(Employee\_ID is the primary key for the Employee relation and a foreign key to the Accounts relation; Payroll\_No is the primary key to the Accounts relation; no attribute should accept a null value)

Write an SQL statement that will:

- i. Create the employee table (structure shown in Table 1) **(2 Marks)**
  - ii. Enter one row of data into the employee table (use your own data) **(2 Marks)**
  - iii. List the employee\_id, first name and last name of all employees from the sales department who joined the company in January. **(2 Marks)**
  - iv. Lists the employee\_id, first name, last name and department of all the employees with a salary balance greater than 20000. **(2 Marks)**
  - v. List the student id of the student with the highest advance paid. **(3 Marks)**
- a) The main objective of the ANSI SPARC three level architecture is to separate the user views of the database form its physical representation. Using a diagram to illustrate, describe each of the three levels in this architecture. **(9 Marks)**



**QUESTION FIVE (20 MARKS)**

- a) A TV company wishes to develop a database to store data about the TV series that the company produces. The data includes information about actors who play in the series and directors who direct the episodes of the series. Actors and directors are employed by the company. A TV series is divided into episodes. Each episode may be transmitted at several occasions. An actor is hired to participate in a series, but may participate in many series. Each episode of a series is directed by one of the directors, but different episode may be directed by different directors.
- i) Identify all the entities in the above scenario. **(4 Marks)**
- ii) Draw the entity relationship diagram to illustrate the relationship between the identified entities. **(6 Marks)**
- iii) Draw a table diagram for each entity that includes at least three attributes and indicate the primary key attribute. **(8 Marks)**
- b) Write a structured query language statements that would display names that begin with letter L from an attribute called “first\_name” from a table named Students. **(2 Marks)**

