NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCES
DEPARTMENT OF COMPUTER SCIENCE

DATA CONCEPTS AND DATA PROCESSING
SCS 1200

Examination Paper
AUGUST 2024

This examination paper consists of 4 pages

Time Allowed: **3 hours**

Total Marks: **100**

Examiner's Name: **Mr. M. Ruzive**

External Examiner:

INSTRUCTIONS

1. Answer any four (4) questions
2. Each question carries 25 marks

MARK ALLOCATION

QUESTION	MARKS
1.	**25**
2.	**25**
3.	**25**
4.	**25**
5.	**25**
TOTAL FOR ANY FOUR QUESTION	100

QUESTION ONE

a. State the duties of the following database workers:

   i) Database Administrator (3)

   ii) Database Designer (3)

   iii) Application Programmers (3)

b. State and briefly explain any three (3) groups of database end users (6)

c. Discuss any three (3) issues associated with data redundancy in database systems (6)

d. Primary and foreign keys are critical in database design; highlight the key difference between them. (4)

QUESTION TWO

a. Compare a Database, Data warehouse and Data Lake in terms of size, data structure and type of data processing. (9)

b. With the aid of a diagram, explain the three schema database architecture, clearly outlining how the architecture achieves data abstraction and data independence. (12)

c. State any four (4) elements described by a conceptual schema (4)

QUESTION THREE

a. What is normalization in database design? (2)

b. Using examples, explain how you get data into the Third Normal Form (3NF) (15)

c. What are the ACID properties and how are they important in the processing of database transactions? (8)

QUESTION FOUR

a. State and briefly explain the five (5) DBMS language categories (10)

b. Using examples explain the following SQL commands:

   i. DELETE
   ii. UPDATE
   iii. SELECT
   iv. GRANT
   v. COMMIT (10)

c. The CREATE command is used to create various database objects, list any five (5) such objects (5)

QUESTION FIVE

A company database keeps track of the company's **employees, departments, employee dependents and projects.** Suppose that we are also given the following:

i. The company is organized into departments. Each department has a **unique name,** a **unique number**, and a particular employee who **manages** the department. A department may have several **locations**.

ii. A department **controls** a number of projects, each of which has a **unique name,** a **unique number,** and a **single location**.

iii. We store each **employee's name, ID number, address, salary, gender**, and **birth date**. An employee is **assigned** to one department, but may **work on** several projects, which are not necessarily controlled by the same department.

iv. We want to keep track of the **dependents** of each employee for insurance purposes. We keep each dependent's **first name, birth date,** and **relationship** to the employee.

Suppose you have been asked to design the database for the Company given the information above, come up with the following:

a. A list of all entities. (4)

b. A list of all attributes for each entity identified, clearly indicating key attributes. (12)

c. The relationships between all identified entities. (4)

d. Draw the ER Diagram for the database (5)

END OF QUESTION PAPER