UNIVERSITY OF ESWATINI

FACULTY OF SCIENCE AND ELECTRONIC ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE

MAIN EXAMINATION, DEC 2019

Title of Paper	:	**Databases and their Design II**
Course Number	:	**CSC 371**
Time Allowed	:	**Three (3) Hours**
Instruction	:	**Answer ANY FIVE questions**

This paper should not be opened until permission has been granted by the invigilator.

Question 1

a) Define the following terms: [9]
   i) Primary key
   ii) 3NF
   iii) User view

b) Distinguish a system catalogue from an index in a database [7]

c) Define and explain the importance of referential integrity [4]

Question 2

a) Give an example, and explain the use of a nested query using a university database [8]

b) Suppose you have created a Premier database. Write a query to list all the columns in your PARTS table as well as the columns' data types [6]

c) How do you normalise a relation from 3NF to BCNF? [6]

Question 3

a) Discuss the process and purpose of normalization 1NF to 3NF [8]

b) Describe problems, use examples, associated with tables are not in 3NF [12]

Question 4

a) Give an example of a table (using an example taken from a university environment) with two repeating groups. [10]

b) Normalise the table in a) to a set of tables in 3NF [10]

Question 5

a) Given the relation ***C***(c1, c2, c3, c4, c5) and that, c1 functionally determines c2; c4 functionally determines c5: normalise the relation to tables in 3NF [10]

b) Given that a ***book*** table captures a book title, ISBN, name of author(s), last name of author|(s), publisher, royalties, and its edition. Determine all functional dependencies and normalise ***book*** to tables in 3NF [10]

Question 6

Mandla owns a chain of four book stores. Design a database for his chain of book stores. Mandla gathers and organizes information about publishers, authors and books. Each book has a code (uniquely identifies each book). In addition, he records the title, the publisher, the type of book, the price, and whether the book is paper back or not. He also records the author or authors of the book along with the number of units of the book that are in stock in each of the branches. Mandla uses this information in a variety of ways. For example, a customer may be interested in books written by a certain author or of a certain type. He wants to be able to tell his customers which books (by author or by type) he currently has in stock. If not in stock in one branch he needs to be able to determine if any of the other branches currently have it.

Design a database to manage Mandla's chain of book stores database. **[20]**