NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
COMPUTER SCIENCE DEPARTMENT
MAY EXAMINATIONS 2002

SUBJECT: DATABASE CONCEPTS
CODE: **SCS 1202**

INSTRUCTION TO CANDIDATES
The Question paper consists of seven (7) questions
Answer any four (4) questions from Section A.
Answer All questions in Section B (**compulsory**)

Time: 3 hours

QUESTION ONE

a) Explain the functions of the following DBMS component modules
   i) Data manager [3]
   ii) Query processor [3]
   iii) Data Definition Language Compiler [3]
   iv) Communications System [3]

b) Define the term Data Dictionary and describe any three functions of a data dictionary system [4]

c) Explain what is meant by data consistency. Explain why the use of DBMS is useful for this purpose? [4]

QUESTION TWO

Discuss the differences between the following file organisations:

(a) serial
(b) index-sequential
(c) sequential
(d) Random

Compare their storage and access efficiencies. To what type of application is each of the organisations suited. [20]

QUESTION THREE

a) Describe the role of a Database Administrator in a database management system. [5]

b) What is meant by data independence? Describe two distinct levels of data independence. [5]

c) Describe the main advantages of the Database approach over the traditional file system approach. [10]

QUESTION FOUR

a) Define the terms:

i) Data integrity [2]

ii) Data Definition Language [1]

iii) Data Manipulation Language [1]

b) Describe the functions carried out by the DBMS and the facilities it offers. [6]

c) With the aid of a diagram describe the tree level architecture of the DBMS [10]

QUESTION FIVE

a) Distinguish between centralised and distributed databases. [6]

b) Define the term data model. [1]

c) Describe the following data models:
   i) Network data model [3]
   ii) Hierarchical data model [3]
   iii) Relational data model [3]

d) In database modeling, what is meant by:
   i) Entity [1]
   ii) Attribute [1]
   iii) Relationship [1]
   iv) primary key [1]

QUESTION SIX

a) Consider a part of database of a banking system consisting of customers and their accounts. Construct an E-R diagram for this scenario. [5]

b) Explain the difference between generalization and specialization. [7]

c) Explain the concept of aggregation. Show several examples where this concept is useful. [8]

SECTION B
(COMPULSORY)

QUESTION SEVEN

Consider the following relations concerning a driving school. The primary key of each relation is underlined.

STUDENT(ID_no, Student_name, class#, Theory_mark, Driving _mark)
STUDENT_DRIVING_TEACHER (Student_name,Driving_Teacher_name)
TEACHER_THEORY_CLASS (Class#,Theory_Teacher_name)
TEACHER_VEHICLE (Driving_Teacher_name,License#)
VEHICLE (Licence#, Make, Model,Year)

A student takes one theory class as well as driving lessons and at the end of the session receives marks for theory and driving. A teacher may teach theory, driving, or both. Write the following queries in SQL.

(a) Find the list of teachers who teach theory and give driving lessons on all the vehicles.
(b) Find the list of students who are taught neither theory lessons nor driving lessons by "Chibaya".
(c) Find the list of students who have marks greater than 56 in both theory and driving lessons
(d) Find the list of students who have marks greater than the average theory mark [20]

END OF QUESTION PAPER

GOOD LUCK!