NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCES
COMPUTER SCIENCE DEPARTMENT
MAY 2001 EXAMINATIONS

SUBJECT: DATA PROCESSING AND DATABASE SYSTEMS
CODE: SCS1200

INSTRUCTIONS TO CANDIDATES
Answer any four questions in Section A and the question in Section B.
Each question carries 20 marks

3 HOURS

SECTION A

1. a) What are the main differences between a file-processing system and a database management System? [8]

    b) List the responsibilities of the database manager. For each responsibility explain those problems that would arise if the responsibilities were not met. [4]

    c) With the aid of examples explain briefly the different types of mapping cardinalities. [8]

2. a) Consider a two-dimensional integer array of size $n \times m$, which is to be used in your favorite programming language.

    i) Illustrate the difference between the three levels of data abstraction. [6]

    ii) Illustrate the difference between a scheme and instances. [4]

    b) List the major steps that need to be taken in setting up a database for a particular enterprise. [10]

3. By considering a banking enterprise:

    a) Identify the entity sets that may exist [4]
    b) Formulate relationship between possible entity sets. [4]
    c) Identify the attribute for each entity set. [4]
    d) With the help of an Entity relationship diagram. Illustrate the mapping cardinalities that may exist. [4]
    e) Explain, with an example from the banking enterprise, the term tenary relationship. [4]

4. a) Construct an Entity relationship diagram for a University registrar's office. The office maintains data about each class, including the instructor, the enrollment, and the time and place of the class meetings. For each student-class passing a grade is recorded. [10]

    b) By considering the University registrar's Office mentioned in 4(a) identify eight operations (queries) that can be generated from it. [10]

5. a) Write brief notes on the following:

        i)   relation and relation scheme
        ii)   the relational algebra and SQL
        iii)   Query processor
        iv)   DDL compiler   [8]

    b) Briefly list and explain the responsibilities of the Database Administrator. [12]

SECTION B

6. Consider the relational database of figure 1 below. Give expressions in SQL for each query below:

    a) Modify the database so that Jones now leaves in Newtown. [4]
    b) Give all employee of First Bank Corporation a 10 percent raise. [4]
    c) Give all managers a 10 percent raise. [4]
    d) Give all managers a 10 percent raise unless the salary becomes greater than $100 000. In such case, give only a 3 percent raise. [4]
    e) Delete all tipples in the <u>works</u> relation for employees of First Bank Corporation. [4]

        lives (person-name, street, city)
        works (person-name, company name, salary)
        location in (company-name, city)
        manages (person-name, manager-name)
        Figure 1

END OF QUESTION PAPER