

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
COMPUTER SCIENCE DEPARTMENT
AUGUST EXAMINATIONS 2009

SUBJECT: DATABASE CONCEPTS

CODE: SCS1200

INSTRUCTION TO CANDIDATES

Answer any four questions. The paper contains six questions.

Time: 3 hours

QUESTION ONE

LORETO High school is a school that stores pupils' records using a traditional filing system. You as new IT personnel in the school have proposed the use of a database system in place of the current record system.

- a) Identify and explain five reasons that will justify your proposition. [15]
- b) State and explain five components required for the database to be functional. [10]

QUESTION TWO

- a) Name and explain the database management system classifications. [5]
- b) With the aid of a diagram, explain the three levels of the three tier, or ANSI-SPARC Architecture. [20]

QUESTION THREE

- a) In relation to database concepts, explain the two types of data independence [6]
- b) In relation to database concepts, how would you categorise the data models [15]
- c) Explain the following terms:
 - i) Persistence [1]
 - ii) Polymorphism [1]
 - iii) Inheritance [1]
 - iv) Data Integrity [1]

QUESTION FOUR

A University has faculties headed by a Dean, each faculty is made up of various departments headed by a chairperson. A department offers a number of degree programmes taken by many students. Each programme has courses that should be done towards the successful completion of the programmes. The courses are prepared and lectured by the lecturers found in the department.

- a. Using the above situation, draw up an E-R diagram to be used as a plan for the University database system. [15]
- b. In relation to databases what does ACID mean? [4]
- c. Using relational algebra:
 - i) Project all the departments in each faculty [3]
 - ii) Restrict all the Programmes in each department [3]

QUESTION FIVE

PupilsDetails(Grade#, ClassCode, TeacherName, GradeDescription, NoOfpupils, PupilName)

Answer the following questions using the above scenario.

- a) Normalize the above schema up to the third normal form [15]

- b) Write an SQL statement to:
 - i) Display the total number of the pupils in each class. [2]
 - ii) Give the average age of the pupils in each class [2]
 - iii) Display all pupils whose surname start with a "D" [3]

- c) In relation to database concepts, explain the following terms:
 - i) Concurrency control [1]
 - ii) Inheritance [1]
 - iii) Transaction [1]

END OF QUESTION PAPER

