THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTING AND IT

DIPLOMA IN INFORMATION TECHNOLOGY

EDT 2002

END OF SEMESTER EXAMINATIONS

APRIL/MAY 2010 SERIES

DATABASE SYSTEM I

TIME: 2 hours

INSTRUCTIONS TO CANDIDATES

Answer question **ONE** and Any other **TWO** questions

SECTION A

Answer ALL questions

Q1.   (i). Outline the limitations of file based systems   **[5 Marks]**

(ii). Explain the following terms

* Database
* DBMS   **[4 Marks]**

(iii). Outline the features of Distributed Databases.   **[2 Marks]**

(iv). List the advantages and disadvantages of client server architecture.
                                                                               [4 Marks]

(v). Explain the concepts given below in the context of relational model.

(a).   Relation
(b).   Attribute
(c).   Domain
(d).   Tuple
(e).   Degree and Cardinality
                                                                               [5 Marks]

(v). State the key players in Database Design and briefly outline their role.
                                                                               [5 Marks]

SECTION B:

Answer TWO questions

Question TWO

(a)   (i). Illustrate the components of a Database Management System (DBMS)
                                                                               [2 Marks]

(ii). Describe each of the components illustrated above.   **[8 Marks]**

(b).   Explain any **SIX** advantages of a DBMS and any **FOUR** disadvantages.
                                                                               [10 Marks]

Question THREE

(a).   Draw a well Labeled diagram of the database development Lifecycle.
                                                                               [8 Marks]

(b)   Explain the function of each section.   **[12 Marks]**

Question FOUR

(a).   Briefly explain the following relational algebra operations: **[5 Marks]**

    (i).   Selection
    (ii).   Projection
    (iii).   Union
    (iv).   Set difference
    (v).   Intersection

(b).   Use the table to answer the questions:

staffNo	fName	lName	Position	Sex	DOB	salary	BranchNo
SL21	John	White	Manager	M	1-Oct-45	30000	B005
SG37	Ann	Beech	Assistant	F	10-Nov-60	12000	B003
SG14	David	Ford	Supervisor	M	24-Mar-58	18000	B003
SA9	Mary	Howe	Assistant	F	19-Feb-70	9000	B007
SGS	Susan	Branch	Manager	F	3-Jun-40	24000	B003
SL41	Julie	Lee	Assistant	F	13-Jun-65	9000	B005

Staff table

    a)   Write a select operation to list all staff with salary greater than 20000.
    b)   Write a projection operation to produce a list of all staff showing only staffNo, fName,
      sex, and salary
    c)   Write a unary operation to list all workers who are females or managers
    d)   Write a set difference operation to list all positions which are assistants but not males
    e)   Write an intersection operation to list all branches with a female worker.
                                                  [15marks]

Question FIVE

(a).   Explain the following:

    • Tuple Oriented relational calculus
    • Domain oriented relational calculus   **[5 marks]**

(b).   Use the table below to answer the questions that follow

Sno	Sex	FName	LName	Property_city	Position	Salary
SL21	M	John	White	London	Manager	30000
SG37	F	Ann	Beach	Glasgow	Snr Asst	12000
SG14	M	David	Ford	Glasgow	Deputy	18000
SG5	F	Susan	Brand	Glasgow	Manager	24000
SA9	F	Mary	Howe	Aberdeen	Assistant	9000
SL41	F	Julie	Lee	Kilburr	Assistant	9000

Staff-property relation

Using tuple oriented calculus performs the following:

(i).   List the names of all mangers who earn more than 25000
(ii). List the staff who manage properties at Glasgow
(iii). List the names of staff who are females

[15 marks]