

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

SUBJECT: ADVANCED DATABASE DESIGN AND MANAGEMENT
CODE: SCS4202

Instructions to candidate:

1. Answer any 3 questions in Section A and ALL questions in Section B

3 HOURS

SECTION A

QUESTION ONE

a) Define the following terms as used in database systems.

- i. Data dictionary
- ii. Logic data independence
- iii. Traditional file system
- iv. Conceptual schema
- v. Database administrator

[10]

b) Produce a labeled diagram to show a database system architecture.

[6]

c) Explain the purpose of mappings between the various levels of architecture in (a).

[4]

QUESTION TWO

Given the following database with three relations, answer the questions below:

EMPLOYEE

Emp_No	Id_No	E_Name	Dept No.
E1	R12	JSmith	D1
E2	R16	Jsmith	D1
E3	R13	Rbrown	D2
E5	P10	Ccloth	D3

EMPLOYEE-EXTENSION

Emp_No	Office	Extension
E1	O101	811
E1	O101	813
E2	O13	111
E3	O35	123
E5	O35	123

DEPARTMENT

DepNo.	D_Name	Manager
D1	Accounts	E1
D2	Stores	E2
D3	Sales	E5

Identify the relations defined by the following expressions in SQL, when applied to the above database.

a) Select*

From Employee

Where E_Name <> "Jsmith" and DeptNo <> "D2" [5]

b) Select Employee.*, Department.*

From Employee.Emp_No=

Where Employee.emp_No=

(Select Department.manager

From Department

Where Department.D_Name="Accounts") [5]

c) Write an SQL statement to display all those employees working in the Sales department. [5]

d) Write an SQL statement to produce the names of employees using Office O35. [5]

QUESTION THREE

Using an appropriate example, explain the following stages of normalization:

1NF

2NF

3NF

BCNF

4NF

[20]

QUESTION FOUR

- a) Describe the components of a database system. [10]
- b) What considerations would you make when choosing a database management system for your organization? [10]

SECTION B

QUESTION FIVE

Given the following tables:

Supplier (Supp#, Sname, Status, City)

Part (P#, Pname, Color, Weight, City)

Project (Proj#, ProjName, City)

SuppPartProject(Supp#, P#, Proj#, Qty)

- a) Write the following SQL statements.
- Write SQL statements to create a view of suppliers in Gweru, and one to create the table Part. [3]
 - Get full details of parts from Harare. [3]
 - Get part numbers for parts supplied to any project by a supplier in the same city as that project. [3]
 - Get the total quantity of part P1 supplied by supplier S1. [2]
 - Change the city of all projects in Gweru to Kwekwe. [2]
 - Get project numbers and cities where the city has an 'o' as the second letter of its name. [3]

b) Convert the following SQL statements to their English equivalent.

i. Select Distinct Supp#

From SuppPartProject

Where Proj# = 'J1'

Order By Supp#

[2]

ii. Select Proj#

From Project

Where city =

(select max(city))

From Project

(2)

QUESTION SIX

a) Discuss the disadvantages brought about by the introduction of a database system in an organization. [10]

b) A company's personnel database is to contain information about the departments and employees of that company. Given that each employee works in one department, invent some sample data and sketch some possible corresponding storage structure, and state the relative advantage of your structure. [10]

END OF QUESTION PAPER

GOOD LUCK!