

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

SUBJECT: DATABASE CONCEPTS

CODE: SCS1202

INSTRUCTION TO CANDIDATES

Answer four questions.
The paper contains six questions.

Time: 3 hours

QUESTION ONE

- a) With the aid of a diagram, describe the three level architecture of a database system and the main functionality of each level in this architecture. [15]
- b) Describe the working process of a database system [5]
- c) What is ACID in relation to database concepts [5]

QUESTION TWO

- a) Explain how concurrence control can be achieved in a database system . [5]
- b) Draw an ER-diagram to describe the following real world problem. [20]
 - I. A University is organized into faculties
 - II. Each faculty has a unique name, ID and a number of professors and a specific professor is chosen as the faculty head.
 - III. Each faculty provides a number of courses.
 - IV. Each course has a unique name and courseid.
 - V. Each professor has a name, EmpNumber, HomeAddress, salary, Gender, and courses by him/her

- VI. Each professor belongs to a faculty and can teach several courses.
- VII. Each faculty has several departments offering several programmes.
- VIII. Each student has a name , ID, address and gender
- IX. Each student can choose one program from one department and several courses from other departments within the faculty.

QUESTION THREE

a) Given the relation in fig.1, construct expressions (using relational algebraic operations) to evaluate the following query.

- i. Find the names of employees who work on all the projects controlled by department of Business computing.

[10]

Employees

Fname	Initial	Lname	bDate	Address	Gender	Salary	<u>EmpNumber</u>
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DEPARTMENT

<u>DNumb</u>	DName	MngrEmpNumber	MngrStartDate
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PROJECT

PName	<u>PNum</u>	pLocation	DNumb
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WORKS -ON

<u>empNumber</u>	<u>PNum</u>	Hours
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Fig 1

b) Explain the following terms in relation to database concepts.

- I. Foreign key [1]
- II. Candidate key [1]
- III. Primary key [1]
- IV. Referential integrity [1]
- V. Domain Integrity [1]

c) How is a relational data model different from an Object Oriented data model?

[10]

QUESTION FOUR

- a) Outline the features of a table in 1NF and 2NF
[5]
- b) Write an SQL statement to do the following
- I. Create a table called 1202Students
[2]
 - II. Display the average age of the students
[3]
 - III. Display the total number of students in class
[3]
 - IV. Display students by the departments
[4]
 - V. Delete the table called 1202Students
[2]
 - VI. What attribute could be used to identify each student in the 1202Students table
[1]
- c) Using an example explain the concept of ODBC in relation to database concepts
[5]

QUESTION FIVE

- a) What properties characterize a relational table
[5]
- b) Given the scenario in fig 2, Normalize the tables to third Normal form (3NF)
[16]

StockDetails

Stock#	Wld	StockName	Wname	WAddress	Qty	WManager
B01	CC	Bolts	City Centre	15 Main Strret Ave	200	Prince S. Dube
N30	BT	Nuts	Belmont	10 old Esigoni rd	20	George Paradza

Key: W – warehouse
Fig 2

c) In an Microst Access Database Management System (DBMS), what is used for
:

I. Data capture?

[2]

II. Output?

[2]

QUESTION SIX

- a) Name and explain the categories of data models
[12]
- b) You have been offered a Job as Database Administrator at a reputable lodge in Beitbridge. Outline your duties in that position.
[5]
- c) Contrast the Distributed and Centralized database systems
[4]
- d) Name four classes of end users giving an example in each class.
[4]

END OF QUESTION PAPER

