

300 LEVEL PAST QUES

Ahmadu Bello University, Zaria
Department of Computer Science

2017/2018 First Semester Examination
COSC 309: Database Management Systems

Date: 10th May, 2018

Time Allowed: 120 Minutes

Instructions:

1. Answer ANY FOUR questions.
2. Write all your answers in the spaces provided on this Question Paper.

Invigilator's Signature:

Registration Number: Signature:

Date: Time:

Scores:

Question	Maximum Scores	Scores Obtained
1	15	
2	15	
3	15	
4	15	
5	15	
6	15	
Total	60	

Questions Answered				
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300 L

[5 Marks]

1a. Define the following terms.

S/No	Term	Definition
1	Data	
2	Database Management System (DBMS)	
3	Database	
4	Database Schema	
5	Data Model	

b. What is the difference between physical and logical data independence?

[5 Marks]

c. A friend tells you that her company uses a file-based approach for organizing, storing and sharing their data.

i. What does she mean?

[2 Marks]

ii. The company wants to move its current file-based system to a database system. In many ways, this can be seen as a good decision. Identify three disadvantages in adopting a database approach.

[3 Marks]

2a. i. What is a database instance?

[2 Marks]

ii. Differentiate between Attribute defined and Predicate-defined subclasses.

[3 Marks]

b. i. Describe the three-schema architecture.

[3 Marks]

ii. Why do we need the mappings between different schema levels?

[2 Marks]

c. List three different types of interfaces provided by a DBMS.

[5 Marks]

3a. Define the following terms.

[5 Marks]

S/No	Term	Definition
i.	Strong Entity	
ii.	Attribute	
iii.	Relationship type	
iv.	Multi valued attribute	
v.	Key attribute	

b. The organizers of the EXAM 2011 international multi-conference need to keep track of a large collection of workshops associated with the event. Initial requirements analysis brings out the following information about what needs to be recorded.

- Each workshop has a name, and happens on a particular date or dates, as some workshops last more than one day.
- There are several participants, each of which may sign up to one or more workshops.
- For each participant, it is important to record their name, email address, and the workshops which they wish to attend.
- There are a number of meeting rooms at the conference venue, each of a fixed capacity. Meeting rooms are identified by a floor and room number.
- Every workshop needs an allocated meeting room; where a workshop lasts for two days, it will use the same room on both days.
- Draw an entity-relationship diagram suitable for representing this information, in particular the connections between participants, workshops, rooms, and dates.

[5 Marks]

- c. For each of the following concepts give a brief description of what it means, and give an example from your ER diagram from 3b. [5 Marks]

S/No	Term	Description and Example
i	Key	
ii	Composite key	
iii	Total participation	
iv	Key constraint	
v	Data independence	

4.a. NULL value in relational theory is used to represent values that are unknown or inapplicable to certain tuples.

i. Is the above statement correct?

[1 Marks]

ii. Which, if any, of the following may accept a NULL value:

[1 Marks]

1. A candidate key
2. A foreign key

iii. List the three main types of constraints in the relational model.

[3 Marks]

bi. Explain the difference between a simple attribute and entity set.

[2.5 Marks]

ii. What is the difference between a relational schema and relation set?

[2.5 Marks]

ci. List the constraints that may possibly be violated by the INSERT Command of SQL.

[1 Marks]

ii. For each of the constraint you have identified in 4a(iii), give a brief description of how that constraint can be violated using the INSERT Command of SQL.

[4 Marks]

5a. Define *Disjoint partial* and *Overlapping total* specialization concepts.

[4 Marks]

b. Briefly explain the Unary Relational operations of *relational algebra*.

[3 Marks]

c. Write relational algebra expressions to answer the following queries using the table below:

EMPLOYEE

Fname	Lname	SSN	Bdate	Dno
Isah	Ali	1112	1994-01-09	3
Joy	John	1221	1998-02-08	3
Musa	Ahmad	2321	1985-03-15	1
Aliko	Haziki	8819	1992-04-01	2
Zainab	Isah	1224	1995-01-09	1

DEPARTMENT

Dname	Dnumber
Chemistry	3
Computer	2
Physics	4
Biology	1

i. Retrieve SSN, first name, and last name of employee that belongs to department number 3.

[2 Marks]

ii. Rename the name of the relation (EMPLOYEE) and its attributes Fname, Lname, SSN, Bdate, and Dno to NEW_EMP, FirstName, LastName, SSNumber, BirthDate and Dnumber respectively.

[3 Marks]

ii. Retrieve the name and address of all employees who work for the 'Chemistry' department.

[3 Marks]

6. Use the tables below to answer the following questions:

ACCOUNT

No	Type	CName	Amount	BranchID
100	Current	Aminu, U.	8,700	34
101	Savings	Onimisi, A.	13,040	67
103	Current	Kufena, A.	34,761	34
107	Current	Kufena, A.	25,060	56
119	Savings	Benjamin, I.	45,201	56
125	Current	Monday, D.	34,005	67

BRANCH

BranchID	BName	City
34	Samaru	Kaduna
67	Sabo	Kano
56	Malali	Kaduna
77	Mile 2	Enugu

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Write SQL statement that execute the following:

a. Retrieves the name and account balance (Amount) of all customers in Sabo branch. [3 Marks]

b. Give all customers in Samaru branch a 10 percent raise on their account balance. [3 Marks]

c. For each branch, retrieve the branch number, branch name, total number of customers that hold account in that branch and their average account balance. [4 Marks]

d. Create a separate table with the same structure as the **Account** table to hold archive records. Using the **INSERT** statement, copy the records from the **Account** table to the archive table relating to amount greater than 20,000. [5 Marks]