POKHARA UNIVERSITY

Level: Bachelor Semester: Spring Year: 2023
Programme: BE Full Marks: 100
Course: Database Management System Pass Marks: 45
Time: 3hrs.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.
Attempt all the questions.

1. A) Differentiate between database schema and instances. Briefly describe DDL, DML, and DCL. [8 marks]

1. B) Define relational data model. Draw an E-R diagram for a Library Management System Including primary key, weak entity, composite attribute, derived attribute and multivalues attributes in your ER diagram. [7 Marks]

2. A) Suppose we have the following relation. [8 Marks]

Employee(person_name, street, city)
Works(person_name, company_name, salary)
Company(company_name, city)
Write relational algebraic expressions for the following queries:

i. List the name and city of employee who work in "pokhara" and have salary greater than rs.50000.
ii. Find the names of all employees who work for "ABC bank".
iii. Delete all the employee who come from "Chitwan".
iv. Increase salary of all employee by 15%.

2. B) What are different kinds of joins? Explain in brief. [7 Marks]

3. A) Write SQL statements for the following queries using the given Employees relation: [8 Marks]

E_id	Fname	Lname	Department	Salary	Hire_Date
01	Ramu	Bashyal	Sales	20000	2023-08-08
02	Damu	Pandey	IT	50000	2022-01-01
03	Biru	B.K.	Sales	40000	2021-02-10
04	Hiru	Dhamala	HR	35000	2023-12-18
05	Biren	Khadka	IT	60000	2012-10-22

i. Create a database named Company and Employees relation.
ii. Create a view that shows E_id, Department, and Hire_Date of all employees
iii. Modify the table such that the Department of Biren is HR now
iv. Delete the record of employees whose Lname is "Pandey".

3. B) What is referential integrity? Explain about trigger with an example. [7 Marks]

4. A) What is database normalization? Explain in detail about 1NF, 2NF, 3NF with suitable examples. [8 Marks]

4. B) What are authorization and authentication? Why are they important? Exlpain in detail. [7 Marks]

5. A) What are the steps in query processing? Make an operator tree for the following SQL expression:

```
Select customer_name
FROM branch, account, depositor
WHERE branch_city = 'btl' AND balance>2000;
```

5. B)What are the benefits of using B Tree index over the sequential and indexed sequential file organization? Explain. [8 Marks]

6. A) Explain log based recovery system with an appropriate log record example. [7 Marks]

6. B) Why should the transactions schedule be serialized? Explain conflict and view serializability with an example. [8 Marks]

7. Write short notes on: (Any two) [2x5 Marks]

a) Data Dictionary
b) Stored procedure
c) Object oriented database

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1. a) Define schemas and instances. What are the major functions of Database Manager? Discuss. [7 Marks]

1. b) Explain the benefits of data model. Construct an ER diagram for keeping records for Library Management system. [8 Marks]

2. a) Consider the following schema: [8 Marks]

EMPLOYEE(Employee_ID, Employee_Name, Department)
PROJECT(Project_ID, Project_Title, Budget)
WORKS_ON(Employee_ID, Project_ID, Hours_Worked)
Write the relational algebra expression to:

i. Find the names of all employees who are working on a project with a project title that contains the word 'Development'.
ii. Update the budget of projects to 1,000,000 where the budget is currently less than 500,000.
iii. Find the total hours worked by each employees across all projects.
iv. Update the name of 'HR' department to 'Human_Resources'.

2. b) Write the SQL statements for the following queries by reference of Hotel_details relation. [7 Marks]

3. a) What are the advantages of normalization? Illustrate importance of normalization with suitable examples. [8 marks]

3. b) Why Integrity constrains are used? Explain types of integrity constraints with examples. [7 Marks]

4. a) Differentiate between authorization and authentication. Explain about private key cryptography with example. [8 Marks]

4. b) What is query processing? Explain its steps with block diagram. [7 marks]

5. a) Create a B+ tree of order 4 with the following data: (1,4,7,10,17,21,31,25,19,20,28) [7 MARKS]

5. b) Explain log based recovery and different methods of keeping log along with examples. What is shadow paging? [8 marks]

6. a) What is view serialize ability? Explain 2PL and time stamping. [7 marks]

6. b) What are distributed database systems? Explain advantages and disadvantages of object oriented database model. [8 marks]

7. Write short notes on: (Any two) [2x5 Marks]

a) Data Abstraction
b) ACID
c) Triggers