

Term Test II

Date:	2080/10/18	Full Marks
Level	BE	
Programme	BCE	Time
Semester	III	1.5 hrs

Subject: - Database Management Systems

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

- 1.a) Why Normalization is needed? Explain 1NF,2NF,3NF with suitable examples. [8]
- b) Differentiate between authorization and authentication. Explain about access control and view. [7]
- 2.a) What is query optimization. Explain the steps involves in query processing with diagram. [8]
- b) Construct a B+ tree of order 4 to insert the following items into the tree {2,3,5,6,10,16,18,22,29,32}. [7]
- 3.a) Consider the relational database
 Employee (e_name, age, street, city)
 Works (e_name, c_name, salary)
 Company (c_name, city) [10]

Write RA (relational algebra) and SQL query for the following cases:

- I. Find the names of all employee who live in 'Pokhara' and whose salary is greater than Rs30000.
- II. Find the names and street of all employee who work for 'Nepal bank limited'.
- III. Update the salary of all employee by 12.5% who work for Nepal bank limited.
- IV. Delete all the records of employee working in Nepal bank limited and whose age is greater than 60.

4. Write short notes on (any two): [2*5=10]
- a) Functional dependencies
 b) Stored procedures
 c) Dense and sparse index

Lumbini Engineering College

Final Internal Exam

Level	Bachelor	Time	3 hrs
Programme	BE (Computer)	FM	100
Semester	III (Third)	PM	45
Course	Database Management System (DBMS)	Year	2080

- ✓ Candidates are requested to give their answer as far as practicable in their own words.
- ✓ The figure in the margin indicates the full marks
- ✓ Attempt ALL questions

1. Define database management system (DBMS). Mention the advantages and disadvantages of DBMS. [8]
2. What is data independence? Explain the type of data independence. [7]
3. Construct an E-R Diagram for a Online Stores including primary key, weak entity, Composite attribute, derived attribute and multivalued attributes in your ER diagram. [8]
4. Explain the concept of DDL DML DCL with suitable example of each. [7]
5. Explain about database normalization and its importance. Explain 1NF, 2NF and 3NF with suitable example. [8]
6. What is query processing? Explain the step used in query processing. [7]
7. What do you mean by integrity constraints? Explain assertion and triggers in SQL with their syntax. [7]
8. Consider the following base relations: [8]
 - a) Employee (E_id, emp_name, street, city)
 - b) WorksIn (E_id, company_name, salary)
 - c) Company (C_id, comp_name, city)
 - d) Manages (E_id, mngr_name)

Write relational algebra for

- i.Find names and cities of all employee who work for which manager name is "Rohan".
- ii.List employee detail who works in "Fuse Machine" company.
- iii.Modify the database so that "Sakar" now lives in "Bhalwari".
- iv.Give all employees of "Fuse Machine" a 10% salary rise.
9. What is a transaction? Write about the ACID property of any transaction. [7]
10. Create a B+ tree of order 4 with following data : (6, 11, 18, 27, 3, 22, 15, 17, 12, 13, 14) [8].
Assume that tree is initially empty and values are added in ascending order.
11. What is remote backup system? Describe shadow page recovery. Why is this recovery technique called no undo/no redo technique? [7]
12. What is blockchain technology, and how does it work? Briefly write the concept of decentralized ledger in blockchain. [8]
13. Write short notes on (Any two) [5*2=10]
 - a) Stored Procedure
 - b) NoSQL
 - c) ORM

(;) Best of Luck (;)

National Academy of Science and Technology

(Affiliated to Pokhara University)

Dhangadhi, Kailali

Pre-University Examination

Level: Bachelor

Semester: III- Fall

Year : 2023

Program: B.E. Computer

F.M. : 100

Course: Database Management System

P.M. : 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) Define database and DBMS. Explain the types of database Architecture? 7

b) Consider a bus ticketing system that records information about the passenger, bus and route. Passenger is assigned to a bus that travels to a route. A bus contains many passengers and a passenger can be assigned into only one bus. Many busses travel in same route but a bus can travel in only one route. The attributes of passenger are pid(unique), gender and phone_no(multi-values). Similarly bus contains regno(unique) and color and route contains rid(unique), distance and rate.

Make a complete ER diagram for this and explain all the cases given in question with the help of diagram.

2. a) Consider the following relational database. 8

Patient(PID, Pname, Paddress, Pgender, disease)

Doctor(DID, Dname, Daddress, Department, salary)

Appointment(PID, DID, time)

Write the SQL statement for the following.

1. List all the patients who were checked by doctors Pravin and Rubi.
2. List name and id of doctors whose salary is less than Rs. 120,000.
3. Delete doctor details whose salary is less than 25000.
4. Increase salary of all doctors by 10% who works in Forensic department.

b) Consider the following relational database.

STUDENT(Ssn, Name, Major, DOB)

COURSE(Cnum, Cname, Dept)

ENROLL(Ssn, Cnum, Semester, Grade)

BOOK_ADOPTION(Cnum, Semester, ISBN)

8

TEXTBOOK(ISBN, Title, Publisher, Author)

1

Write the relational algebra for the following.

1. List any department that has its adopted books published by 'Iris publishing'.
2. Find the names of students who have not been enrolled in any course.
3. Delete the detail of student whose Major is 'DBMS'.
4. List the course number taken by all students named 'John Smith' in winter 1999 (i.e., Semester = 'W99').

3. a) What is Normalization? Explain BCNF and 3NF with suitable example. 7
b) Explain the different types of integrity constraints with examples. 7
4. a) What is Access Control Mechanism (ACL) in database? Explain different types of access control. 8
b) Discuss the steps involved in query processing with suitable diagram. 7
5. a) Define concurrency control. How do two phase locking and graph based protocol control concurrency? 7
b) What is file organization? Explain file organization using hash based index and B+ tree index. 8
6. a) What is crash recovery? Explain the log based recovery techniques with example. 8
b) What is distributed database? Explain the advantages of NoSQL over SQL. 7
7. Write Short notes on any two: 2×5
- a) Assertion and Triggers
 - b) Blockchain
 - c) ACID Properties



Pokhara University
Everest Engineering College
Final Internal Assessment
Fall-2023

Level: Bachelor

F.M. 100

Program: BE CMP(3rd semester)

P.M. 45

Faculty: Science & Technology

Time: 3hrs

Subject: Database Management System

Attempt all the questions.

- 1 a) Explain the need of DBMS over file system. Explain Database Application Architecture (Two-tier and Three -tier architecture in brief. 8
- b) Construct and ER diagram for a banking enterprise that keeps the information about employee, customer, loan, account and payment. 7
- 2 a) Using the following schema represent the following queries using relational algebra: 8
- Project(projectnum, projectname, projecttype, projectmanager)
Employee(Empnum,Empname)
Assigned_to(projectnum,Empnum)
- i) Insert one records in project relation.
ii) Update the database so that project manager of “Trishuli Hydropower” is “Krishna”
iii) Find Employee details working on a project name starts with ‘L’
iv) List all employee details who are working under project manager “Rohan.”
v) List the employee who are still not assigned with any project.
- b) Why do we need normalization? Explain 1NF,2NF and 3NF with examples. 7

- a) Suppose we are given the following table definitions with certain records in each table.

Employee(Eid, Name, Post, Age)

Post(Post_title, Salary)

Project(Pid, Pname, Duration, Budget)

Work_in(Pid, Eid, Join_date)

Write SQL statement for:

- List the name of employees whose age is greater than the average age of all employees.
 - Display all employee numbers of those employees who are not working in any project.
 - List name of employee and their salary who are working in the project "DBMS."
 - Update the database so that "Rishab" now lives in "Butwal".
- b) How Join differs from subquery. Explain Stored procedure with suitable examples.

- 4 a) What do you mean by integrity constraints? Explain Domain integrity constraints, Entity integrity constraints and Referential integrity constraints with examples. 7
- b) Differentiate between authorization and authentication with brief examples. 7
- 5 a) With a diagram, Explain the steps of Query Processing. 8
- b) Construct a B+ tree for the set of values. (4,9,16,25,1,20,13,15,10,11,12) 7
- Assume that the tree is initially empty, and values are added in ascending order. Construct B+ tree for the case where number of pointers that will fit in one node is four. Also show the form of tree after deletion of 16. 8
- 6 a) Differentiate between exclusive lock and shared lock. Discuss the conflict serializability with example and show the mechanism of testing conflict serializability. 8
- b) Explain log-based recovery scheme with suitable examples. 7
- 7 Write short notes on: (Any two) 7
- ACID properties of transaction
 - Schema and Instances
 - Hash Index
- 2*5
=10

Good Luck

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UNITED TECHNICAL COLLEGE

Semester-Fall

Level	:	Bachelor	Year	:	2023
Programme	:	BE(3rdSem)	Full Marks	:	100
Course	:	Database Management System	Pass Marks	:	45
			Time	:	1.5hrs

Candidates are required to give their answers in their own words as far as practicable.

Attempt any Four questions from (1-6) and Q.N.7 is Compulsory

1. a) Compare and contrast between file system and database system. Difference between schema and Instances. 7
b) Construct E-R model for a car insurance company whose costumer own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Also design a relational database corresponding to the E-R diagram. 8
2. a) Consider the following relational schema:
Department (DepartmentID, DepartmentName)
Designation (DesignationID, DesignationName, Salary)
Employee (EmpID, EmpName, Gender, DesignationID, DepartmentID)
Allowance (AllowanceID, AllowanceName)
Allowances Details (DetailID, EmpID, AllowanceID, Amount)
Write the relation algebraic expression for the following task:
a) Find the number of employee's department wise.
b) List the employee details whose total salary is above Rs 50,000.
c) List the employee those who are getting house allowance.
d) Find the employee id and name whose department id is 5. 8
- b) How does a view differ with relation? Define the role of view in security. 7
- a) Write the SQL statements for the following queries by reference of Liquors_Info relation. 8

Serial No	Liquors	Start year	Bottles	Ready year
1	Gorkha	1997	10	1998
2	Divine Wine	1998	5	2000
3	Old Durbar	1997	12	2001
4	Khukuri Rum	1991	10	1992
5	Xing	1994	5	1995

- a) Create the Liquors_info relation.
- b) Insert the records in Liquors_info as above.
- c) List all the records which were ready by 2000.
- d) Remove all records from database that required more than 2 years to get ready.

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- b) What do you mean integrity constraints? Explain assertion and trigger in SQL with their syntax. 7
- 4 a) What do you mean by Normalization? Explain the 1NF, 2NF and 3NF with examples 8
b) Differentiate between authentication & authorization. How encryption and decryption occur Private Key & Public key cryptography? 7
- 5 a) Explain sequential file organization. What are hash functions, explain with giving example? 7
b) Write a detail description about Query processing and Optimization. Explain the cost estimation of Query Optimization 8
- 6 a) Compare the Shadow paging recovery scheme with the log-based recovery schema. 8
b) Explain the conflict and view serializability with suitable example. Discuss the testing of serializability also. 7
- 7 Write short notes on: (Any One) (1*5=5)
a) Remote backup system
b) ACID properties
c) Distributed database

NEPAL COLLEGE OF INFORMATION TECHNOLOGY
Assessment Fall-2023

Level: Bachelor

Year : 2024

Programme: BE. For(CE_D/M) SE D/M)/Civil

Full Marks: 100

Pass Marks: 45

Course: Calculus _II

Time : 3 hrs.

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. ✓ Evaluate $\int_0^1 \int_{4y}^4 e^{x^2} dx dy$ [5]

b. Evaluate $\iiint_V x^2 dx dy dz$ over the region bounded by the plane $x=0$, $y=0$, $z=0$ and $x+y+z=a$ [5]

c. find the volume of the solid whose base in the region in the xy-plane. That is bounded by the parabola $y = 4 - x^2$ and the line $y = 3x$ while top of the solid is bounded by $z=x+4$ [5]

2. (a) solve by power series method : $y'' + y = 0$ [[8]]

(b) Express $f(x) = x^3 - 5x^2 + x + 2$ in terms of legendre polynomials [[7]]
 Or

Solve the Bessel equation $x^2 y'' + xy' + (x^2 - v^2)y = 0$

3. (a) (i) Find the laplace transform of $f(t) = t^2 e^{-t} \sin t$ [4+4]

(ii) find the inverse laplace trasform of $F(s) = \log\left(\frac{s+a}{s+b}\right)$

(b) By using laplace transform solve the initial value problem. [7]
 $y'' + 2y' + 17y = 0 \quad y(0) = 0 \quad y'(0) = 12$

4 (a) A particle moves along the curve $x = t^3 + 1$, $y = t^2$, $z = 2t + 5$ find the component of its velocity and acceleration at $t=1$ in the direction $\vec{i} + \vec{j} + 3\vec{k}$ [5]

(b) If $\phi = x^3 + y^3 + z^3 - 3xy$ find $\operatorname{div}(\operatorname{grad}\phi)$. 5

(c) Evaluate $\int_c \vec{F} \cdot d\vec{r}$ where $\vec{F} = yz\vec{i} + (xz + 1)\vec{j} + xy\vec{k}$ and c is any path

from $(1, 0, 0)$ to $(2, 1, 4)$.

5. (a) Find $\iint_s (\vec{F} \cdot \hat{n}) ds$ for $\vec{F} = 3x\vec{i} + xz\vec{j} + z^2\vec{k}$, S bounded by

$z = 4 - x^2 - y^2$ and XY plane.

(b) Evaluate $\iint_s (\vec{F} \cdot \hat{n}) ds$ by using Gauss divergence theorem if $\vec{F} = (4xz, -y^2, yz)$ S is the Cube bounded by $0 \leq x \leq 1, 0 \leq y \leq 1$ and $0 \leq z \leq 1$ [8]

. OR

Evaluate $\iint \vec{F} \cdot d\vec{r}$ by using Stoke's theorem where $\vec{F} = (y^3, 0, x^3)$ and c is the boundary of the triangle with vertices $(1, 0, 0), (0, 1, 0), (0, 0, 1)$.

6. (a) find the fourier series for the function $f(x) = x^2$ in the interval $0 \leq x \leq 2\pi$ [7]

(b) Find the fourier cosine as well as fourier sine series of function $f(x) = e^x$ in the interval

$0 \leq x \leq L$ [8]

7. Attempt any two. ($5*2=10$)

(a) Find the solution of $u_x + u_y - u = 0$ given that $u(x, 0) = 2$

(b) find the general solution of linear first order constant coefficient partial differential equation.

(c) Find the convolution of the function $e^t * e^{-t}$

Semester - III

ALP

Full Marks: 100

Pass Marks: 45

Time: 3 hours

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

Attempts all the questions:

1. a) Define microprocessor . Differentiate between Von -Neumann and Harvard architecture. 7
b) Define addressing mode. What are the available addressing modes in 8085 μ p ? Explain it with appropriate example 8
2. a) Draw and explain a well labelled timing diagram of the instruction LXI D,3050H and calculate the total execution time if the clock frequency is 5Khz. 7
b) Write an ALP in 8085 to transfer 5 bytes of data of memory address starting from 2050H to 3050H .Comment in each line indicate full marks. 8
3. a) Define DMA . Explain read and write operation of DMA with block diagram. 7
b) Define interfacing . Interface two 4KB RAM with 8085 microprocessor and find the range of each memory chips. 8
4. a) Draw the suitable block diagram of 8255A PPI and explain it 7
b) Define pipelining . Draw the internal block diagram of 8086 microprocessor and expalin it? 8
5. a) Define assembler directives? What are the assembler directives available in 8086 microprocessor. 7
b) Write an ALP in 8086 to display the string “ NCIT COLLEGE “ in reverse order. 8

6. a) Draw and explain the block diagram of Programmable Interrupt Controller (PIC) .7
b)Draw pin diagram of 8086 μ p . Differentiate between Macro and Procedure. 8
7. Write short notes on (*Any two*) $5*2 = 10$
a) Synchronous and Asynchronous Bus
b)Polled and Vectored interrupt
c) Memory Hierarchy

Subject: Database Management System

Candidates are required to give answers in their own words as far as practicable.
The figure in the margin indicates full marks.

Attempt all the questions.

- 1 a. How does features of data enhance for database management? Explain Data abstraction. 2+6
1 b. Construct an ER Diagram for Inventory management system by considering required entity and their associated attributes and their relation. 7
- 2 a. Consider the following relational database.
Students(RollNo, StudentName, Address, Semester)
Teacher(TeacherID, TeacherName, CourseID, Salary, Department)
Courses(CourseID, RollNo, CourseTitle, Semester)
- Write relational algebra expression for the following requests.
- Find the name of the students of 4th semester and studying "OS"
 - Find the name of the teacher who teaches subject "DBMS" to "Mansi Rimal".
 - Delete record of 2nd semester students of Account Department.
- 3 b. Consider the following relational database.
- Project(P_ID, P_Name, P_Location, Type)
Employee(Emp_ID, Emp_Name, Address, Salary, Post, Date_Join)
Works(P_ID, Emp_ID, Shift)
- Write the SQL statements for the following queries.
- Insert new project {1, "ZomZom", "Pokhara", "Soft"}
 - List the name of the employee whose salary is greater than average salary.
 - Remove all the employee who works on the project "ERP".
 - Change address as "BRT" of employee whose Emp_Name is "Rakesh".
- 3 a. Define Normalization. Explain 1NF, 2NF and 3NF.
- 3 b. Define assertions and Triggers. Create a Triggers which store an information of inserting in data to Student table as "Student with ID is inserted in student table" in student_activity tabale. 2+5
- 4 a. Define preferences of security in DBMS. Explain Encryption and Decryption. 8
- 4 b. What is query optimization? List some strategies for optimization of queries and explain steps in query processing with diagram. 7
- 5 a. What is file organization? Explain any 3 types indexing. 7
- 5 b. Explain method of log-based recovery and shadow paging in DBMS. 5+2
- 6 a. Explain ACID properties for transaction. Explain any one of locking protocol for concurrency control. 8
- 6 b. Explain distributed database with its advantages and disadvantages. 8
- 7 a. Write short notes on :(Any two) 2*5
- Blockchain
 - Nested Queries
 - Views

15 February 2024 2:20 pm

POKHARA ENGINEERING COLLEGE
Internal Assessment Examination

Level: Bachelor III Semester - Fall Year
 Program: Computer Engineering
 Course: Database Management Systems

Year: 2023
 Full Marks: 100
 Pass Marks: 45
 Time: 3 hrs.

*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) What are symbols used in Entity-Relation Diagram. Draw a E-R diagram for e-commerce website. (8)
 B) What is data independence? Explain the types of data independence. (7)
- (2) A) a) Consider the Employee table below to answer the questions using SQL. (8)

Doctor(name, age, address)
 Works(name, depart_no)
 Department(depart_no, floor, room)

With the given table as above,

1. Display the records of doctor with their department information.
2. Diplay the name of the doctor with maximum age.
3. Display the number of room in each floor.
4. Update database such that Harry now lives in Chicago.

B) Assume the following relation tbl_employee has the following attributes and tuples.
 Answer the below question using relational algebra. (7)

Name	Office	Dept	Rank
Greenwood	600	CS	Adjunct
Foden	320	Fin	Associate
Saka	200	Eco	Assistant
Mount	180	Fin	Assistant
Smith	300	CS	Associate

- a. Select those employees with name Mount and who are Associate.
- b. Show the name of all employees working in CS Dept.
- c. Show the Name and Rank of those Employees who are not in CS department or Adjuncts.
- (3) A) What is normalization. Explain 1NF, 2NF and 3NF with suitable examples. (8)
 B) Differentiate between authorization and authentication. Also list need for database security. (7)
- (4) A) What is file organization? What are some of the objectives of file organization. List different types of file organization. (8)
 B) Discuss distributed ledged technology. Explain about blockchain and cryptocurrency. (7)
- (5) A) What is transaction? What are some of the operations of transaction. Discuss the conflict and view serializability with suitable example (8)
 B) Define the query optimization. Explain the steps for query processing. (7)

NEPAL COLLEGE OF INFORMATION TECHNOLOGY

Semester Fall

Level: Bachelor

Year: 2023

Program: BE sw/comp

Time: 3 hrs.

Course: Database management system

FM: 100

PM: 45

- ✓ *Candidates are requested to give their answers as far as practicable in their own words.*
 - ✓ *The figure in the margin indicates the full marks*
- Attempt all the question**

1. a. Why there is multilayer architecture present in DBMS? Describe the 3 level schema architectures in detail. 7
Or
Explain the importance of DBMS. How do DBMs help in the field of IT? Also explain how DBMS is accessed using various DDL, DML, and DCL languages.
- b. Draw an ER diagram of an Online Ticket reservation System using extended features. Also, convert it into the schema diagram. 8
2. a. Write Relational algebra for the following schema 9
Book (ISBN, Title, Price, Category, pages)
Written_by (ISBN, Aid, Year)
Author (Aid, Name)
 - i. Find the title and category of the book which was published in 1994, written by "Simanta" and has pages between 400 to 800.
 - ii. Find the number of books published in 1990 that are written by "Simanta".
 - iii. Insert new book entry with ISBN=123456, Title=ABCD, Price, and category are same as DBMS book and pages are same as OS book
 - iv. Increase the price of the book by 15% which has pages >3000 and decrease by 15% which has pages<2500.
 - v. Find the Title, Price, and category of a book whose author information is not provided.
 - vi. Find the maximum and minimum price of the book according to their category. 6
- b. What are the keys in the database why it is needed? Explain all keys present in the database for a given functional dependency and identify the Primary key and candidate key, Prime attributes, and non-prime attributes.
Z->W, Y->XZ, XW->Y

Gandaki College of Engineering and Science

Level Bachelor

Semester - Fall

Year 2023

Program BE

Full Marks 100

Course Database Management System

Time 3 hrs

Examinees are suggested to write precise answers supported with diagrams, table, and examples. Do not write bulky paragraphs.

Attempt all the questions.

- 1 a) Describe about Schemas and Instances Write briefly about DDL and DML 3+4
b) What do you understand by E-R model? Draw an E-R diagram for a Library Management System including primary key, weak entity, composite attribute, derived attribute and multivalued attributes in your ER diagram 2+6
- 2 a) What is a view? Give one example of it. Write importance of data dictionary 3+1+3
b) Given relation schema as below 8

Employee(emp-id, name, address, telephone, salary, age)

Works- on (emp-id, project-id, join-date.)

Project(project-id, project-name, city, duration, budget)

Write the sql commands for the following.

- i Insert new record in project relation
ii Find the name and city of that project on which salary of employee is greater than or equal to 20000
iii List the name of employees whose name starts with "m" and ends with "a"
iv Find the employee name and project name of those employees who living in address Pokhara
v List name of employee whose age is greater than average age of all employees
vi List employee id of all employees whose salary is greater than minimum budget of all projects
vii List employee id of all employees who joint project on "05/01/2015"
viii List the name of employees whose name starts with N or with K
- 3 a) Define normalization Explain about 1NF, 2NF, 3NF with suitable examples. Also discuss brief on Denormalization 8
b) Suppose we have the following relational database 7
employee (person name, street, city)
works (person name, company name, salary)
company (company name, city) Write Relational Algebra for the following questions

Gandaki College of Engineering and Science

Level Bachelor

Semester - Fall

Year 2023

Program BE

Full Marks 100

Course Database Management System

Time 3 hrs

Examinees are suggested to write precise answers supported with diagrams, table, and examples. Do not write bulky paragraphs.

Attempt all the questions.

- 1 a) Describe about Schemas and Instances. Write briefly about DDL and DML 3+4
b) What do you understand by E-R model? Draw an E-R diagram for a Library Management System including primary key, weak entity, composite attribute, derived attribute and multivalued attributes in your ER diagram 2+6
- 2 a) What is a view? Give one example of it. Write importance of data dictionary 3+1+3
b) Given relation schema as below 8

Employee(emp-id, name, address, telephone, salary, age)

Works-on (emp-id, project-id, join-date)

Project(project-id, project-name, city, duration, budget)

Write the sql commands for the following.

- i Insert new record in project relation
ii Find the name and city of that project on which salary of employee is greater than or equal to 20000
iii List the name of employees whose name starts with "m" and ends with "a"
iv Find the employee name and project name of those employees who living in address Pokhara
v List name of employee whose age is greater than average age of all employees
vi List employee id of all employees whose salary is greater than minimum budget of all projects
vii List employee id of all employees who joint project on "05/01/2015"
viii List the name of employees whose name starts with N or with K
- 3 a) Define normalization. Explain about 1NF, 2NF, 3NF with suitable examples. Also discuss brief on Denormalization 8
b) Suppose we have the following relational database 7
employee (person name, street, city)
works (person name, company name, salary)
company (company name, city) Write Relational Algebra for the following questions

- i. Find the names of all employees who does not live in city 'pokhara'
- ii. Find the names of all employees whose salary is greater than 100,000
- iii. Find the names of all employees who live in 'pokhara' and whose salary is greater than 100,000.
- iv. Find the names of all employees who work in "GCES"
- v. Find the names and cities of residence of all employees who work for "GCES"
- vi. Find the names, street address, and cities of residence of all the employees who work for "GCES" and earn more than 20000
- vii. Delete employee's record whose salary is less than 5000

4 a) Explain cryptography and its types with related diagram of each

7

OR
What is NoSQL? What are the types of NoSQL databases? Explain with example

b) Differentiate between authorization and authentication with brief examples Define different types of access control.

8

5 a) Suppose we are given the following table definitions with the certain records in each table.

8

PROJ(PNO, PNAME, BUDGET)

EMP(ENO, ENAME, TITLE)

ASG(ENO, PNO, DUR)

Write the sql statement and RA expression: "Find the names of employees other than Shyam karki who worked on CAD/CAM project for either 2 or 3 years" Construct initial operator tree and final efficient operator tree by following the steps in query optimization.

b) Explain insertion in B+ Tree index file with related example

7

6 a) Explain conflict and view serializability. Test conflict serializability of the following schedule

8

T1	T2	T3
Read(X)		
	Read(Z)	
		Read(X)
Read(Z)		
	Read(Y)	
		Read(Y)
Write(X)		
	Write(Z)	
		Write(Y)
	Write(Y)	

b) Explain transaction and 'ACID' properties. Also write various states of transaction

7

7 Write short notes on (any two)

2x5

a) Blockchain

b) 2PL

c) Shadow Paging

Nepal Engineering College

Assessment

Year: 2024

Full Marks: 100

Time: 3 hrs.

Level: Bachelor

Programme: BE Computer

Course: Database Management System

Candidates are required to give their answers in their own words as far as practicable.

- a. Define DBMS. List out its objectives along with its advantages and disadvantages. (7)
- b. Design an ER diagram for Hospital System. Use your assumption for the selection attributes, entities and relationships. Show the use of total and partial participation along with the appropriate cardinalities. (8)
- a. Consider a database system with following schemes; (7)
Restaurant (Rname, Rlocation, Fname)
Cook(Cname, Cspeciality)
Worksat(Cname, Rname, Workinghrs, Shift)
Food(Fname, Cname, Category)

Now write relational algebra statements for following queries

- i) Select the name and location of all restaurants.
- ii) Find the working hours of cook name "Sita".
- iii) Select name of the food cooked by "Ramesh".
- iv) Find the name of cooks who work as "KFC"
- b. Explain different types of join in SQL with examples. Use join to select name of restaurants where food of category "breakfast" is available on above relation. (8)
- a. Define attributes sets in ER-Model. Explain different types of attributes. (7)
- b. Consider a database system with following schemes; (8)
Department (deptno, dname, city) – dname indicates department name.
Employee (empno, ename, salary) – ename indicates employee name.
Works (empno, deptno)
Write SQL expression for the following requests.
 - i) Find name of employees whose name start with "S".
 - ii) Find department of employee 'Jack'.
 - iii) Decrease salary of employees by 10% whose salary is greater than 50000.
 - iv) Find the number of employees in each department.
 - v) Delete record of all employees whose city is 'Kathmandu'.
- a. Why do we need database security? Define Access Control and explain different types of Access control mechanism. (7)
- b. Assume that set of functional dependency $AB \rightarrow C$, $C \rightarrow D$ and $D \rightarrow A$ are simultaneously satisfied by a relation R(ABCD). Find the closure of

functional dependency. Why normalization is necessary in RDBMS Explain. (8)

- a. What do you mean by query processing? Explain the steps involved in query processing. (7)
 - b. Define file organization? Discuss different types of file organization technique. (8)
6. a. Differentiate between shared and exclusive lock. Discuss the conflict and view serializability with suitable examples. (7)
b. Explain different type of failure in DBMS. Explain remote back up system along with several issues to be addressed while designing it. (8)
7. Write short notes on: (Any two) ($2 \times 5 = 10$)
 - a. ACID properties of transaction.
 - b. NoSQL Databases
 - c. Distributed database