Year 2004

Attempt any SIX questions: [6 x 5 = 30]

1. Describe different types of data abstraction used in database management system. Describe data independence. Mention the role of DBA.
2. How can a weak entity set always be made into a strong entity set? Outline what sort of redundancy will result if we do so. Explain with an example.
3. Consider the relations:

person(driver-id#, name, address)

car(license_no,model,year)

Accident(report_number,year,location)

Owns(driver-id#,license)

Participated(driver-id#,license_no,report-number,damage-amount)

4. Give an expression in relational algebra of the following queries.

a. Find the names of person whose license_no is LAC_202

b. Find the damage amount of all persons.

c. Add a new accident to the database; assume any values for required attributes.

d. Delete the accident record belonging to "John Smith".

e. Update the damage amount for the car with license number "AABB2" in the accident with report number "AR2" to 3000.

5. List the parts of the SQL.

Write SQL syntax for the followings.

a. Create the following table.

Column	Data Type
Name	char

D_O_B	Date
Basic_salary	Number
Deduction	Number
Emp_Code	Char

a. emp_code is primary key.
b. Insert a record in the table.

c. Increase the basic salary by 15%

d. Delete the data of those employee whose deduction is more than 500

e. List those name of employees having deduction in between 100 to 300.

5. Define referential integrity and extraneous attribute. Give an example for extraneous attribute.

6. Mention the physical characteristics of magnetic disks. What is disk controller and what are its functions? Explain.

7. How BCNF differs from third normal form? Consider the relation Employee and functional dependency show below. What is the highest normal from of the following relation? Transfer it into higher normal form?

EMPLOYEE(EMP_ID,EMP_NAME,SKILL_TYPE,HRLY_RATE)

Key(EMP_ID,SKILL_TYPE)

SKILL_TYPE HRLY_RATE

Year 2005

Attempt Any SIX Questions: [6×5=30]

1. a. What are the advantages of database system over traditional file system? Explain.
   b. Differentiate between total participation and partial participation in database.
2. What to understand by Normalization? Why we require it? Explain 1 NF, 2 NF, 3 NF and BCNF in brief.
3. a. What is functional dependency? Write about partial and transitive functional dependency. b. Define super key, candidate, and primary key in database design.
4. Define attribute closure. On the basis of given relation schema and set of functional dependency F, verify that (AG) is primary key. R=(A, B, C, G, H, I) F={A→B, A→C,CG→H, CG→I, B→H}
5. Define file organization. Explain how records in files are organization based on sequential file organization and clustering file organization. Also mention the circumstances under which these file organization are appropriate.
6. List the three design goals for relational databases, and explain why each is desirable. Consider the following relational database.

Works (employee_name, company_name, salary)

Company (company_name, city)

Manager (employee_name, manager_name)

Given an SQL DDL definition of this database. Identify referential-integrity constraints that should hold, and include them in the DDL definition.

Year 2006

1.Given Brief Answer: [1 x10=10]

1. Why concurrent access is required in database system? Does file processing system allow concurrent access?
2. How can you define superkey for relationship set R if R is relationship set among strong entity sets E1,E2, and E3?
3. What are the fundamental operations in relational algebra?
4. Write the basic syntax to create view in SQL.
5. What is schema of a database?
6. What is E-R diagram?
7. What is superkey?
8. what is data model?
9. Write the statement of second normal form?
10. W hat is magnetic disk?

Group B

1. Define database mnagent system. Explain data abstraction in detail with suitable diagram. Describe the various functions of database administrator?
2. What is updata anomaly? Expain with an example.
3. Consider following relational database:

Department (deptno, dname, city) – dname indicates department name.

Employee (empno, ename, salary) – ename indicates employee name.

Works (empno, deptno)

4. Write relational algebra or SQL expression for the following requests.

a. Fine name of employees whose name start with “S”.

b. Find department of employee ‘Jack’.

c. Decrease salary of employees by 10% whose salary is greater than 50000.

d. Add a department to the database: assume any values for required attributes.

e. Delete record of all employees whose city is ‘Kathmandu’

5. Explain different techniques used for implementing variable length records in file organization with figures?

6. What is data model? Construct an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero or any number of recorded accidents.

7. What are extraneous attribute and canonical cover? Write an algorithm to compute canonical cover of Functional dependencies.

8. Write short notes on (Any two)

a. Generalization b.Functional Dependencies c.Third Normal form.

Year 2007

Give Brief Answer : [10×1=10]

1. What is referential integrity? Give an example.
2. What are the fundamental operations of Relational algebra?
3. What do you understand by extraneous attributes?
4. What is the advantage of view in database?
5. Define transitive and partial functional dependencies.
6. What do you understand by schema of a database?
7. What is role of buffer manager?
8. What is insertion anomaly?
9. What is trigger? Write syntax to define trigger in SQL.
10. Why is embedded SQL required?

Group 'B' Attempt any SIX question

1. What is data abstraction? Explain the different levels of data abstractions.
2. What is normalization? Explain 1NF and 2NF with examples.
3. Consider the following relational database of a college.

Student(RollNumber, StudentName, Address)

Teachers(TeacherID, TecherName, TeachingSubject)

College(RollNumber, TeacherID)

whose salary is greater than 50000.

4. .Write SQL or Relational algebra expression for the following requests.

a. Find the name of teacher who teaches Database Management System subject.

b. Find the name of Students who live in Lalitpur.

c. Find the name of teacher who teaches Computer Organization subject to John Smith student.

d. Insert a new tuple into relation teachers

e. Delete records of students whose address is "Pokhara".

Year 2009

Brief Answer Questions: [10×1=10]

1. What do you mean by canonical cover of functional dependency?
2. What is three-tier architecture?
3. Define closure of attribute.
4. What is NULL value?
5. What do you mean by file organization?
6. What is partial dependency?
7. How weak entity set can be made strong?
8. If Relation r1 has 3 rows and Relation r2 has 5 rows, how many rows will be returned by the Cartesian product of r1×r2?
9. Why is normalization essential?
10. Write statement of third Normal form.

Group 'B' Attempt any SIX question

1. What is Database Management System (DBMS)? How DBMS can hide low level details from the users? Explain.
2. What are the constraints on generalization / specialization? Explain with examples.
3. What is Structured Query Language (SQL)? Explain SQL Data Definition Language (DDL) with examples.
4. What is extraneous attribute? Write an algorithm to calculate closure of functional dependency.
5. Explain different integrity constraints in Database with examples.
6. Consider the following relations

a. Personal__information(person__id, fName, mName, iName, Gender, Address, email, phone)

b. Dependent(dependent__id, person_id, fName, mName, iName, Gender, relation)

7. Write SQL or Relational algebra statement for following:

a.Insert new person (assume values of respective fields).

b. Change phone number of person with person_id 8 to 4433881.

c. Delete record of all dependent whose iName is 'xyz'.

d. Retrieve names of all persons who have boy as dependent.

e. Retrieve fName of all persons who are male and whose address is 'aaa'.

8. Explain the sequential file organization. Differentiate between variable length record and fixed length record with example.

Year 2010

Brief Answer Questions: [10 x1=10]

1. Make a distinction between physical and logical data independence.
2. What do you mean by discriminator of weak entity set?
3. What do you mean by embedded SQL?
4. Define view.
5. What is user defined generalization?
6. Define trigger.
7. Differentiate super key from candidate key.
8. What is the purpose of operator in relational algebra?
9. When is decomposition lossless?
10. What do you mean by distributed database system?

Group 'B' [5´3=15]

1. What are the different types of database users? Explain.
2. Construct an E-R diagram for a car insurance company whose customer owns one or more cars. Each car is associated with zero to any number of recorded accidents. Assume the required attributes.
3. What do you mean by domain and referential integrity constraints? Explain.
4. What do you mean by anomalies? Explain the different types of anomalies.
5. Define natural join on relations r and s. Explain the left outer join, right outer join and full outer join operations.
6. Explain the ACID properties with supportive example.

Group 'C'

1. What is normalization? Consider the following relation in 1NF:

STUDENT (name, grade, semester, program, roll, gender)

The relation has following functional dependencies

name – semester

roll – program

grade – gender

Now normalize the relation up to 3NF.

2 .Consider the following schema of the relational database:

Books (Bid, Btitle, Bauthor, Bpublisher, Bprice)

Members (Member_id, Name, Designation, Age)

Reserve (Member_id, Bid, Date)

has following functional dependencies

name – semeste

1. Find the name of member with maximum age.
2. Find the name of Member who have reserved both the books with title “DBMS” and “Database”.

- Increase the price of “DBMS” book by 10%.

2010. Find the authors and titles of books reserved on 27-May-2010.
2011. Delete all the books of publisher Bud Press.

1. Consider a database with following relations:

DOCTOR (name, age, address)

WORKS (name, deptno)

DEPARTMENT (deptno, floor, room)

Write down the SQL for the following.

1. Display the number of doctors in each address.
2. Delete the department where no one works.
3. Display the room of doctor with maximum age.
4. Display the deptno of those doctors whose address whose address do not start with ‘U” or ends in ‘U’.
5. Increase the age of all doctors working in top floor by 1.

Year 2011

Brief answer questions: [10 x 1=10]

1. What do you mean by instance of a database?
2. What do you mean by closure of attributes?
3. Define Natural Join.
4. What do you mean by Functional dependency?
5. What do you mean by embedded SQL?
6. What is view? Write syntax to define a view in SQL.
7. What do you mean by NULL values?
8. What do you mean by composite attributes?
9. Define trigger.
10. What is parallel database system?

Group "B" Short answer questions:

1. What is transaction? Explain two phase locking protocol.
2. What is query processor? Write about components of query processor.
3. What is Normalization? Normalize the following relation into BCNF.

CustomeID	CustomerName	SalesPerson	Region
8023	Ajaya	Amrit	South
9167	Bipin	Binita	West
7924	Sangita	Amrit	South
6837	Sanjana	Sabin	East
8596	Ruma	Binita	West

7018	Ashok	Rajan	North

5. Discuss the types of mapping cardinality in brief.
6. What is distributed database? How it differs from centralized database system?

Group “C” Long Answer Questions:

7. The department store database system contains information about customers, items they order, departments in the store, employees and suppliers of merchandise. For customers we record their name, address, salary and orders they have placed. The orders are for certain items and should include a description of the item, item no and quantity. Items are usually being supplied by more than one supplier at different prices. The store needs to keep contact information about the suppliers.

   Identify the entity sets, attributes and relationship sets and construct E-R diagram for the system.

8. Consider a database schema of company.

   Employee (employee_name, street, city, age)

   Works (employee_name, company_name, salary)

   Company (company_name, city)

   Managers (employee_name, manager_name)

   Where the primary keys are underlined

   9. Write relational algebra expression for the following queries

   a. Insert the new record of employee who works for IBM Company located in Darchula.

   b. Find the names and cities of employee who work for the “Deerwalk Company”

   c. Find the names and cities of employee who work for the “Deerwalk Company”

   d. Delete the record of employees whose salary is greater than 5000.

e. Increase the salary of employees by 10% on employee relation whose salary is less than 2000.

f. Find the maximum salary of employee.

10 . Consider a simple relational database of hospital management system

a. Doctors (DoctorID, DoctorName, Department, Address, Salary)

b. Patients (PatientID, Patent Name, Address, Age, Gender)

c. Hospitals (PatientID, Doctor ID, HostpitalName, Location

11. Write down the SQL for the following.

a.Find the name of the doctors whose salaries are greater than average salary of doctors.

b.Remove record of patient with patient ID = 44.

c. Find the name of doctor who do not work in Teaching Hospital

d. Display id of patients admitted to hospital of Biratnagar and whose name contains exactly 3 characters.

e. Increase the salary of doctors by 12% who works in General Medicine department.

TRIBHUVAN UNIVERSITY
FACULTY OF MANAGEMENT
Office of the Dean

Full Marks: 40
Time: 2 hrs.

2012

BIM / Fourth Semester / ITC 218: Database Management System

Candidates are required to answer the questions in their own words as far as practicable.

Group "A"

1. Brief Answer Questions: ***[10 × 1 = 10]***

i. Define transaction.
ii. Why normalization is required?
iii. Write the responsibilities of concurrency control manager.
iv. What do you mean by transitive dependency?
v. List the advantages of using DBMS.
vi. Who is naïve user?
vii. What is advantage of getting closure of an attribute?
viii. Differentiate between assertion and trigger.
ix. State any one Armstrong's Rules.
x. What do you mean by embedded sql?

Group "B"

Short Answer Questions: ***[5 × 3 = 15]***

2. Differentiate between centralized database and distributed database. Also write their application area.
3. Define constraint. Write about mapping cardinality, domain constraint and total participation.
4. What is the function of storage manager? Describe its components.
5. Describe two phase-locking protocol.
6. Travel agency maintains the database of passengers traveling on aircrafts in specific routes. Each passenger is assigned in at most one aircraft and one aircraft can contain more than one passengers. An aircraft can travel in only one route but one route can contain one or more aircrafts. Passenger have id (unique), name (composite), phone (multi-valued), birth_date and age. Route has number (unique) and distance. Aircrafts have regno (unique), name and capacity. Draw ER diagram which represents the given scenario.

Group "C"

Long Answer Questions: ***[3 × 5 = 15]***

7. Describe insertion, update and deletion anomalies. Normalize the following relation up to third normal form.

Name	Roll	Semester	College	Phone	Admitted_Year	Address
ABC	1	8	XYZ	98123	2007	KTM
ABC	1	6	MNP	98650	2008	BKT
ACD	30	2	XYZ	98675	2010	BKT
BCD	2	6	MNP	98760	2007	KTM

8. Consider the following schema of the relational database:

Publisher (pid, name, location)

Book (bid, title, author, page, price)

Publish (bid, pid, publish_date)

Write Relational algebra expression for the following:

i) Delete book which price is greater than 400.

ii) Find the name of publisher which has published "Data Structure using C++".

iii) Change price of book "Database Management System" to 800.

iv) "Data Communication" written by ABC is published by "pearson", book id is 509 and publisher id is 238; insert this information in above database.

v) Find price of all books.

9. Consider the following schema of the relational database:

Passenger (pid, name, age, weight)

Bus (bid, name, capacity)

Assign (bid, pid)

Travel (bid, rid)

Route (rid, distance)

Write SQL statement for the following:

i) Find name of passenger who are traveling in bus named "Agni Yatayat".

ii) Add attribute price in table Route.

iii) Delete the name of passenger whose name ends with 'a'.

iv) Display the name of bus all buses.

2013

BIM / Fourth Semester / ITC 218: Database Management System

Candidates are required to answer the questions in their own words as far as practicable.

Group "A"

1. *Brief Answer Questions:* *[10 × 1 = 10]*

i. What do you mean by extraneous attributes?
ii. What do you mean by database management system?
iii. What do you mean by primary key of a relation?
iv. What is view? Write syntax to define a view in SQL.
v. What are the fundamental operations in relational algebra?
vi. What is distributed database?
vii. What is data independence?
viii. What is insertion anomaly?
ix. What is trigger? Write syntax to define trigger in SQL.
x. Why embedded SQL is required?

Group "B"

Short Answer Questions: *[5 × 3 = 15]*

2. Explain the different levels of data abstractions.
3. Explain 1NF and 2NF with example.
4. What are the types of mapping cardinality? Explain briefly.
5. Write algorithm to compute closure of given set of functional dependences.
6. Explain two phase locking protocol.

Group "C"

Long Answer Questions: *[3 × 5 = 15]*

7. A university registrar's office maintains data about the following entities:
   - Courses (number, title, credits, syllabus, and prerequisites)
   - Course offerings(course_number, year, semester, section number, instructor(s), timings, and classroom)
   - Students (student-id, name, and program;)
   - Instructors (identification number, name, department, and title.)

   Construct an E-R diagram for the registrar's office. State any assumptions made in the design of the E-R diagram

8. Consider the following relational schema of company where the primary keys are underlined:

   EMPLOYEE (EMPLOYEE_NAME, STREET, CITY)

   WORKS (EMPLOYEE_NAME, COMPANY_NAME, SALARY)

   COMPANY (COMPANY_NAME, CITY)

   MANAGERS (EMPLOYEE_NAME, MANAGER_NAME)

Write SQL statement for the following queries: *[5 × 1=5]*

a. Find names and cities of employee who works for the "ABC Company"
b. Find name of the manager of Mac Company
c. Delete record of employees whose salary is greater than 10000.
d. Increase salary of employees by 5% on employee relation whose salary is below 12000.
e. Find average salary of each company.

9. Given the following relations where the primary keys are underlined:

EMPLOYEE (EMPLOYEE_NAME, STREET, CITY)

WORKS (EMPLOYEE_NAME, COMPANY_NAME, SALARY)

COMPANY (COMPANY_NAME, CITY)

MANAGERS (EMPLOYEE_NAME, MANAGER_NAME)

Write Relational algebra expression for the following queries. *[5 × 1=5]*

a. Find name of the manager of Microsoft Company.
b. Find names and cities of employee who works for the "CISCO Company"
c. Delete record of employees whose salary is less than 10000
d. Increase salary of employees by 5% on employee relation whose salary is less than 5000.
e. Find minimum salary of the employee of each company.

✡✡✡

Time: 2 hrs.

2014

BIM / Fourth Semester / ITC 218: Database Management System

Candidates are required to answer the questions in their own words as far as practicable.

Group "A"

1. ***Brief Answer Questions:*** *[10 × 1 = 10]*
   - i. What do you mean by schema of a database?
   - ii. What is theta join?
   - iii. What do you mean by entity constraint?
   - iv. How parallel database differs from centralized database?
   - v. What do you mean by functional dependency?
   - vi. What is extraneous attribute?
   - vii. Write syntax to define trigger in SQL.
   - viii. Why is dynamic SQL used?
   - ix. What is NULL value in database?
   - x. What do you mean by closure of an attribute?

Group "B"

Short Answer Questions: *[5 × 3 = 15]*

2. Explain 3NF and BCNF with examples.
3. What do you mean by distributed database system? Explain different reasons for building distributed database system.
4. Write SQL statement to create following tables:
   Project (Pid, pname, budget)
   Employee (Eid, name, address, Pid) Foreign Key Pid References Project
5. What is transaction? Explain concurrent transactions with example.
6. Consider schema U={A,B,C,D,E,F} and the functional dependencies
   AB →C, B →E, CF →D. Find closure of AB.

Group "C"

Long Answer Questions: *[3 × 5 = 15]*

7. Design a database using ER diagram for a mobile shop. This mobile shop maintains information about entities: customer, mobile, bills , and login.
   - Customer has attributes: cid, cname, address, phone, type, the cname is composed of first_name, middle_name, and last_name.
   - Mobile has attributes: model, name, brand, IMEINo. A customer may purchase one or more mobile and request only one bill for payment.
   - Login has attributes: userid and password
   - Bill has attributes: billno, cname, amount.

   State any assumptions made in the design of the E-R diagram
8. Consider the following relational database.

Students(RollNumber , StudentName, Address, Year)

Teachers(TeacherID, TeacherName, CourseID, Salary, Department)

Courses(CourseID, RollNumber, CourseTitle, Semester)

Write relational algebra expression for the following requests

i) Find the name of the Students of 3rd year and studying Computer Network .

ii) Find the name of the teacher who teaches subject "Database System" to Rajan Sharma.

iii) Find the maximum salary of teacher in each department.

iv) Delete record of 4th year students of Account department.

v) Change salary of teacher Arju Shrestha from 21000 to 17000.

9. Consider the following relational database

Project (P_ID, P_Name, P_Location, Type)

Employee (Emp_Id, Emp_Name, Address , Salary, Post, Date_Join)

Works (Dept_No, Emp_Id, Shift)

Write the SQL statement for the following queries

i) Insert new project {'P1002','Edge of tomorrow', 'Putalinagar', 'Private'}.

ii) List the name of the employees who work at "Save the Children" project.

iii) List the name of the employees whose salary is above the average salary.

iv) Remove record of all employees who work in morning shift at the project located in Bagbazar Kathmandu.

v) Change address and post of employee 'Singh Shab' to 'Pokhara' and 'assistant lecturer'.

✡✡✡

BIM / Fourth Semester / IT 220: Database Management System

2015

Candidates are required to answer all the questions in their own words as far as practicable.

Group "A"

Brief Answer Questions: ***[10 × 1 = 10]***

1. Differentiate between generalization and specialization.
2. List any four advantages of relational DBMS.
3. Define one to one relationship.
4. Write SQL syntax to create a VIEW.
5. Why is GROUP BY clause used?
6. What is delete anomaly?
7. Write functions of storage manager.
8. Why is domain constraints required?
9. What is isolated transaction?
10. What is serializability?

Group "B"

Exercise Problems: ***[5 × 4 = 20]***

11. Write down the SQL statements to create following tables(assume appropriate data types) :

    Customers(**customerID,** customerName, phone, date_of_birth)
    Orders(**orderID**, orderDate, deliveryDate, **customerID(FK)**)
    Payments (**paymentID**, paidDate, amount, **orderID(FK)**)

12. Consider the following relations and write the SQL statements to :

    Customers(**customerID,** customerName, phone, date_of_birth)
    Orders(**orderID**, orderDate, deliveryDate, **customerID(FK)**)
    Payments (**paymentID**, paidDate, amount, **orderID(FK)**)

    a. Find the total amount paid by each customer.
    b. Find the list of those customers who has not made any orders till date.

13. Normalize following table:

    Product_details

Pid	Pname	Price	mid	Mname	Address	Phone
1	ABC	1000	101	EFG	Ktm, Bkt	4412
2	XYZ	2000	101	EFG	Bkt	4561
1	ABC	3000	102	MNP	Ltp, Ktm	2341
3	ABC	1000	105	LBD	Brt, Bkt	2169
4	XYZ	1000	105	LBD	Ktm	6635

14. Write algorithm to find closure of attribute sets.

15. Design ER model of a database for a world-wide package delivery company (e.g., DHL or Fed EX). The database must be able to keep track of customers (who ship items) and customers (who receive items); some customers may do both. It is known that every order has a one-time payment. Choose appropriate attributes and list all assumptions made (if any).

Group "C"

Comprehensive Answer Questions: *[2 × 5 = 10]*

16. List functions of concurrency control manager. Explain shadow paging algorithm of database recovery technique.

17. Identify and explain database users.

✡✡✡

Time: 2 hrs.

2016

BIM / Fourth Semester / IT 220 / ITC 218: Database Management System

Candidates are required to answer all the questions in their own words as far as practicable.

Group "A"

Brief Answer Questions: *[10 × 1 = 10]*

1. List any four major characteristics of DBMS.
2. What do you mean by data abstraction?
3. What is use of Entity Relationship Diagram?
4. What happens if a view is updated?
5. Why do we need normalization?
6. What is the advantage of creating primary key in a table?
7. How can authorization and authentication be implemented using SQL commands?
8. Write down the uses of GROUP BY clause.
9. Why do we need data recovery mechanism?
10. What is concurrency control in database management system?

Group "B"

Exercise Problems: *[5 × 4 = 20]*

11. Normalize the following schema, with given constraints, to 3NF.

    books(isbn, title, author, publisher)

    users(userid, name, deptid, deptname)

    Given functional dependencies:

    isbn → title

    isbn → publisher

    isbn → author

    userid → name

    userid → deptid

    deptid → deptname

12. SoftNEP Pvt. Ltd., an IT Firm provides multiple services to its client. A client can take multiple services with a service start date and service end date. A client has to pay annual to renew the service for another year.

    Draw the ER-model for the given scenario (assuming any other relevant facts if necessary).

13. Write SQL statements of create tables for following entities:

    Person(pid, name, address)

    Class(classid, pid, total_number_of_students)

14. Define serial schedule with an example. Explain various transaction states in the database.
15. Explain Basic Timestamp Ordering (TO) Protocol of concurrency control technique.

Group "C"

Comprehensive Answer Questions: *[2 × 5 = 10]*

16. Consider the following relations

    Users(userID, username, password, email, dateOfBirth, gender, registeredDate)
    Categories(categoryID, categoryName, upperLimit)
    Expenses(expenseID, spentDate, amount, categoryID, userID)
    Write down the SQL statements for the following:

    a. Insert a new user.
    b. Find users whose date of birth is before Jan 01, 2000.
    c. Find top 5 categories on which users spend their money.
    d. Find categories in which no expenditure has been made so far.
    e. Find those users whose expenditure is not less than that of userID 405.

17. Define different types of joins and differentiate between join operation and sub query.