POKHARA UNIVERSITY

Level: Bachelor   Semester – Spring   Year   : 2005
Programme: BE   Full Marks : 100
Course: Database Management System   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) List four significant differences between a file processing system and a DBMS. 4

   b) Construct an ER Diagram for PU Central Library System which keeps the books/journal information, library member information. Associated with a log of various transactions like Issue, Return and information. 6

   c) Explain logical and physical data model. 5

2. Consider the relational database 9

   EMPLOYEE(<u>Empname</u>, Street, City)

   WORKS(<u>Empname</u>, Cmpname, Salary)

   COMPANY(<u>Cmpname</u>, City)

   MANAGES (<u>Empname</u>, Cmpname)

   The primary keys are underlined.

   a) Give an expression in the relational algebra for each request.

   i) Modify the database so that Amrit now lives in Naxal

   ii) Delete all tuples in the WORKS relation for employees of XYZ corporation.

   iii) Increase salary of all employees of ABC company by 10 percent.

   b) Write SQL for above 2 a) question. 6

3. a) Explain 5

   i) Functional Dependency

   ii) Multivalued Dependency

   b) What do you mean by normalization of database? Explain 2NF and 3NF with suitable schemas. 10

4. a) What do you mean by CRYPTO SYSTEM? Explain briefly. 8

b) What is the meaning of equivalence of expression in query optimization? 7

5. a) Explain the hashing. What do you mean by bucket overflow? 8

b) Compare the shadow paging recovery scheme with the log based recovery schemes in terms of ease of implementation and overhead cost. 7

6. a) How two-phase locking is achieved in DBMS? What disadvantages result? 8

b) Discuss the relative advantage and disadvantages of centralized and distributed database. 7

7. Write short notes on (**Any Two**): 2x5
   a) Primary key and composite key
   b) Left and Right outer join
   c) Multiple Granularity
   d) Discretionary access control.

Level: Bachelor	Semester – Spring	Year	: 2006
Programme: BE		Full Marks: 100	
Course: Database System		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. Briefly, explain the different type of database user. **10**

   b) What do you mean by database schema? Define super key, candidate key and primary key. **5**

2. a) What do you mean by Relational Algebra? Explain the fundamental operations in Relational Algebra. **5**

   b) From the following schema: **5**

   Depositor = (customer_name. account_number)

   Borrower = (customer_name. loan_number)

   Write the Relation Algebra to

   - Find all tuples of loan for amount >$1200.

   - Find all customers who have both loan and account.

   - Find all customers who have an account but no loan.

   c) Write relational tuple calculus expression for question no. 2 (b). Write any two. **5**

3. a) What are the properties of Relations? Define the terms tupl, domain, degree and cardinality by the help of relation. **5**

   b) Write the SQL statements for the following queries by the reference of **wine_cellar** relation. **10**

SN#	Wine	Producer	Year	Bottles	Ready
1	Chardonnay	Bottlers	1997	10	1998
2	Chardonnay	Coca	1998	5	2000
3	Pinot Noir	Simi	1997	12	2001
4	Merlot	Cline	1991	10	1992
5	Zinfandel	Rafanelli	1994	5	1995

    i.   Creates **wine_cellar** schema.

    ii.   Inserts record in **wine_cellar** as above.

    iii. Lists all record which were ready 2000.

    iv. Changes wine name as Vodka produces by coca.

    v.   Removes all record from database required more than 2 year to ready.

What is data integrity? Compare the features to handle the large database which constraint is applicable.

4. a) What do you mean by vies in DBMS? Explain the constraint under which a relation can be updated through view. — 5

   b) Define database integrity. Classify the integrity constraints of Database. — 5

   c) Describe Referential Integrity. Explain the state and transition constraints. — 5

5. a) An initial schema of a relation is given as: — 2+3 +3

   Publisher_schema = (ISBN, Title, Pages, Publisher, Topic1, Topic2).

   Normalized it into 1NF, 2NF and then 3NF.

   b) Define 3NF. Compare 3NF with BCNF. — 7

6. a) Describe ACID properties of transaction. What are the different transaction states? — 5

   b) What do you mean by concurrency? Why concurrency control is essential? — 5

   c) Describe the two-phase commit. Explain the function of the transaction statement;- *Begin, Commit, and Rollback.* — 5

7. Write short notes on (**Any Two**): — 5×2

   a) Access control

   b) Statistical database

   c) Tuple and domain relational calculus

   d) Optimization

POKHARA UNIVERSITY

Level: Bachelor   Semester – Spring   Year   : 2007
Programme: BE   Full Marks: 100
Course: Database Management System   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) What do you mean by DBMS? Explain the database organization with necessary diagram.   7

   b) Draw a neat E - R diagram of a library database. Assume entities, relations, attributes keys and constraints and state them clearly.   8

2. a) Let us assume the following relations   8

   P: Q:

EmpNo	EName	Salary
E001	Ram	5000
E002	Shyam	7500
E003	Krish	4500
E005	Radha	12000

EmpNo	EName	Salary
E002	Shyam	7500
E003	Krish	4500
E004	Arun	12000
E007	Girish	9500

   Now write the result of following relational algebraic operations on the basis of above relations:

   i)   P U Q
   ii)   P ∩ Q
   iii)   P – Q
   iv) $\sigma_{(salary<=7500)}$ P
   v)   P × Q

   b) Suppose we are given the following table definitions with the certain records in each table. (Underlined attributes represent Primary key attributes)   7

   EMPLOYEE(<u>EMPNO</u>, NAME, ADDRESS)

   PROJECT(<u>PNO</u>,PNAME)

   WORKON(EMPNO, PNO)

   PART(<u>PARTNO</u>, PARTNAME, QTY_ON_HAND)

   USE(<u>EMPNO,PNO,PARTNO</u>,NUMBER

Now write the SQL command for the following:

   i.   To create the EMPLOYEE table. (assume your own data types for attributes)

   ii. To insert a record into the EMPLOYEE table.

   iii. To retrieve the names of the employees who are working on a project named "DBMS".

   iv. To retrieve the name of the parts for which the number of parts used is greater then 50.

3. a) What is normalization? Why it is needed? How can you say that the table is in Second and Third Normal Form? Explain with examples.   8

   b) What is Integrity constraint? How does data integrity Constraint differ with Data Security? Explain.   7

4. a) What do you mean by data encryption? Is it necessary for stored data? Explain.   5

   b) Where does the query optimization take place in database system? Explain the techniques of query optimization by example.   5

   c) What is equivalence of expression? Explain with suitable example.   5

5. a) What is data dictionary storage? Explain Heap file organization.   7

   b) How does log-based recovery and shadow paging recover the data crash? Explain by supporting figure.   8

6. a) What are the properties of transaction? Discuss the concept of multiple granularities in locking mechanism of concurrency control.   10
8

   b) Explain the features and goal of distributed database.   5

7. Write short notes on (*Any Two*):   2×5

   a) Buffer Management

   b) Data independence

   c) Generalization and Specialization

POKHARA UNIVERSITY

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)	Discuss advantages if DBMS over conventional Data processing file system?	7
	b)	Draw a neat E-R diagram of a library database. Assume entities, relations attributes keys and constraints and state them clearly.	8
2.	a)	What do you mean by relational algebraic operators? Explain all the basic operators by examples.	8
	b)	Explain DDL and DML operations with suitable example.	7
3.	a)	What is multivolume dependency and functional dependency? Explain functional dependency with suitable example.	7
	b)	What is normalization? Why it is needed? How can you say that the table is in second and third normal form? Explain with example.	8
4.	a)	What is access control? Discuss the basic components of access control.	7
	b)	Where the query optimization takes place in database system? Explain the techniques of query optimization.	8
5.	a)	What is hashing? Explain failure classification.	7
	b)	What is transaction? Define the ACID property of transaction by example.	8
6.	a)	What is distributed database? Define its major issues and challenges.	8
	b)	Define the crash in database system and its recovery. Explain with example.	7

7. Write short note on *(Any Two)*   5×2
   a) Granularity
   b) Data dictionary
   c) Indexed sequential file

POKHARA UNIVERSITY

Level: Bachelor   Semester – Spring   Year   : 2008
Programme: BE   Full Marks: 100
Course: Database Management System   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 physical and logical data independence.   5

   b) State the difference between a Database Management System and an Information Management System.   5

   c) Consider the relational database   5

   Employee (<u>Empname</u>, street, city)

   Works (<u>Empname</u>, cmpname, Salary)

   Company (<u>cmpname</u>, city)

   Manages (<u>empname</u>, mgrname)

   Give an expression in relational algebra for each request.

       i. Modify the database so that Hari now changes his name to Harish.

       ii. Increase the salary of all employees of Harati Company by 15 percent.

2. a) Construct an ER diagram for a departmental store that keeps the information about customer, supplier and Item. Associate with a log of various selling and purchasing information.   7

   b) What is a cross product of two tables? Why is the result of a cross product typically not meaningful? What is a natural join? How does it differ from an equijoin.   8

3. a) What do you mean by candidate key? Differentiate between primary key and foreign key with example.   8

   b) What is multi valued dependency? Explain fourth and fifth normal form.   7

4. a) What is cryptography? Explain the types of cryptography system.   7

1

b) Consider the following SQL query for our college database: 8

   SELECT T.Studentname

   FROM Student T, Student S

   WHERE T.Rollno > S.Rollno and S.city = "Pokhara"

Write an efficient relational-algebra expression that is equivalent to this query. Justify your choice.

5. a) Compare different methods of implementing variable length records. Why spanned records increase processing overhead. 5

   b) Explain Heap file organization in brief. 5

   c) Identify the different types of failures that may affect a database. Illustrate with the help of examples. 5

6. a) During its execution, a transaction passes through several states, until it finally commits or aborts. List all possible sequence of states through which a transaction may pass. Explain why each state transaction may occur. 8

   b) Write advantages and disadvantages of distributed database. 7

7. Write short notes on *(Any Two)* 2×5

   a) QBE

   b) Lock based protocol verses Time-stamping-based protocols

   c) Log based recovery verses Shadow paging

POKHARA UNIVERSITY

Level: Bachelor   Semester – Fall   Year   : 2009
Programme: B.E.   Full Marks : 100
Course: Database Management System   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) What is data independence? Define logical and physical independence of data with the help of example.   5

   b) Which data model is more popular among Personal Computer and why? Define the characteristics features of record based data mode.   5

   c) Define the terms Relation, Tuple, Domain, Degree, and Cardinality.   5

2 a) Consider the relational databases   10

     Employee (<u>EID,</u> Name, street, city)

     Works (<u>EID, CID,</u> post, salary)

     Company (<u>CID,</u> cname, location)

     Write relational algebraic expression and SQL statements for: 5

       i   An employee changes EID as 101 whose address Kathmandu

       ii Remove all employee record who worked as Manager and Company ID=005.

   b) What does the HAVING clause do? What is its relationship to do GROUP BY clause?

3. a) Make a list of security concerns for a bank. For each item on your list, state whether this concern relates to physical security, human security, operating system security or database security.   7

   b) Compare advantages and disadvantages of heap and sequential file organization. If records are to be processed randomly which one do you prefer among those two organizations?   8

4. a) What is an Integrity constraint? Briefly explain the different type of Integrity constraints.   7

b) Briefly explain the query processing and optimization technique.   8

5. **a)** Differentiate between following with suitable examples. **(Any two)**   8

     i.   Joined dependency verses multi-valued dependency

     ii.   Inner join verses Outer join

     iii.   Schemas verses instances

   b) What are the problems of concurrent transactions? Can these problems occur in transaction which do not read the same data values?   7

6. a) What is the need of database recovery? What is the basic unit of recovery?   5

   b) Briefly explain the two-phase locking protocol   5

   c) What are the advantages of distributed database over the centralized database?   5

7. Write short notes on **(Any Two)**   5x2

   a) DDL and DML

   b) Normalization

   c) E.R diagram

POKHARA UNIVERSITY

Level: Bachelor | Semester – Spring | Year : 2009
Programme: BE | | Full Marks: 100
| | Pass Marks: 45
Course: Database Management Systems | 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) What are the problems caused by data redundancies? Can data redundancies be completely eliminated when a database approach is used? Explain this with the help of an example.   7

b) What is ER diagram? Construct an ER diagram for a banking enterprise that keeps the information about employee, customer, loan, account and payment.   8

2.
a) Consider the schema given below: 8
    Branch-scheme (Branch-name, asset, Branch-city)
    Customer-scheme (Customer name, street, customer-city)
    Deposit-scheme (Branch-name, account-number, customer-name, balance)
    Borrow-scheme (Branch-name. loan-number, customer-name, amount)
    Client-scheme (Customer-name, banker-name)
    Write the relational algebric for the following :
    i.   Find all customers who have a balance of over Rs. 1000.
    ii. Write the query to find the clients of banker Mahesh, and the city they live in.
    iii. Write a statement to find all the customers who have a loan amount of more than Rs. 1200

b) What is normalization ? Why it is needed? Also explain BCNF and 3NF.   7

3.
a) What do you mean by Integrity Constraints? Explain its types.   8
b) What is public key encryption? Briefly explain.   7

4.
a) Explain different steps involved in query processing.   7
b) Define hash function and hashing. Explain Bucket overflow mechanism in hash file organization.   8

5.
a) Compare the Shadow paging recovery scheme with the log based recovery schema.   7
b) What is transaction? Describe Two phase Locking protocol (2PL)   8

6.
a) What are the advantages of distributed database over the centralized database?   7
b) Consider the relational database   8
    Employee(Empno, Name, Address)
    Project (Pno, Pname)
    Workon(Empno, Pno)
    Parts (Partno, Partname, Qty_on_Hand)
    Use (Empno, Pno,Partno)
    The primary key are underlined
    Now write the SQL command for the following
    i.   Modify the database so that Jones now lives in Pokhara
    ii. Give an SQL DDL Definition for Employee table(assume your own data types for attributes)
    iii. Insert a new record into the employee table
    iv. To retrive the name of the employee who are working on a project named "DBMS"

7. Write short notes on(Any Two):   5×2

a) Multiple Granularity
b) Atomicity and Consistency property of transaction
c) Access Control

POKHARA UNIVERSITY

Level: Bachelor Semester – Fall Year : 2010
Programme: BE Full Marks : 100
  Pass Mark : 45
Course: Database Management System 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. The DBA controls the security aspects of the DBMS implementation. Discuss the software and hardware controls available to the DBA, and how this could fit into a commercial environment. 7

   b. Explain the different data models. List the advantages and disadvantages of these models. 8

2. a. What is difference between primary index and secondary index? Explain. 5

   b. How will you model natural join using relational algebra? Write down the steps involved. 5

   c. Explain any five fundamental operations in relational algebra. 5

3. a. Consider the relational database 8

   Employee(Enpno, Name, Address)
   Project (Pno, Pname)
   Workon(Empno, Pno)
   Parts (Partno, Partname, Qty_on_Hand)
   Use (Empno, Pno, Partno)
   The primary key are underlined

   Now write the SQL command for the following:
   i. Modify the database so that Jones now lives in Pokhara
   ii. Give an SQL DDL definition for Employee table (assume your own data types for attributes)
   iii. Insert a new record into the employee table
   iv. To retrieve the name of the employee who are working on a project named "DBMS"

1

b. What is normalization? Why it is needed? Also explain BCNF and 4NF. 7

4. a. Explain entity integrity and referential integrity. Also, give an example of each. 6

b. What is meant by un-normalized relation ? Define Boyce-Codd Normal Form. With the help of an example differentiate BCNF with Third Normal Form. 9

5. a. Explain the structure of Index sequential file with the help of a diagram. 7

b. Explain the query processing and optimization process. 8

6. a. Compare the Shadow paging recovery scheme with the log based recovery schema. 8

b. What is transaction? Describe Two phase Locking protocol (2PL). 7

7. Write short notes on **(Any Two):** 2×5
   a. Multiple Granularity
   b. Full outer join
   c. Weak and strong entity

Level: Bachelor   Semester – Fall   Year   : 2011
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) Discuss the problems in early information processing systems and highlight the role of database management systems in your own word. 7

   b) What do you mean Data model? Differentiate the importance in terms of security and accessibility. 8

2. *a)* By using following schemas write relational algebraic expression and SQL statements. *(Underlined attributes represent Primary key attributes)* 10

      EMPLOYEE(EMPNO, NAME, ADDRESS)
      PROJECT(PNO,PNAME)
      WORKON(EMPNO, PNO)
      PART(PARTNO, PARTNAME, QTY_ON_HAND)
      USE(EMPNO,PNO,PARTNO,NUMBER)

      i.   Listing all the employee details who are not working yet.

      ii.   Listing Part Name and Quantity on hand those were used in DBMS project.

      iii. List the Name of the projects that are used by employee from Kathmandu.

   b) How does a view differ with relation? Define the role of view in security. 5

3. a) Write SQL statements for the following queries in reference to relation **Emp_time** provided. 7

Eid#	Name	Start_time	End_time
E101	Mangale	10:30	18:30
E102	Malati	8:30	14:30
E103	Fulmaya	9:00	18:00

   i.   Create the table **Eid#** as primary key and insert the values provided.

   ii.   Display the name of the employee whose name start from letter 'M' and who work for more than seven hours.

   iii.   Delete the entire contents of the table so that new data can be inserted.

b)   Explain in brief about relational model. Write the 12-E. F. Codd rules formulated for a pure RDBMS.   8

4.   a)   What is referential integrity? Explain with example about functional dependency and multivalued dependency.   7

b)   What is normalization? How will you make the given table stdmaster with attributes: st_id, st_name, instructor_id, Inst_name, course_id1, course name1, courseid2, coursename2, coursid3, coursename3, in 1st 2nd and 3rd normal form. Write the steps.   8

5.   a)   What is query optimization? Explain the steps involved in query processing.   7

b)   What is file organization? Explain heap file organization stating its advantages and disadvantages over other file organization.   8

6.   a)   What is remote backup system? Describe shadow page recovery. Why is this recovery technique called no undo/no redo technique?   8

b)   What is serialzability? What is the benefit of allowing concurrency? Explain the problems associated with concurrency?   7

7.   Write short notes on **any two:**   2×5

a)   Spanned versus unspanned record

b)   OODBMS

c)   Advantages of distributed database processing

d)   Data dictionary storage

POKHARA UNIVERSITY

Level: Bachelor Semester – Fall Year : 2012
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) Define information. Explain the statement "DBA has central control over the database system." 7

    b) Construct an ER diagram for keeping records for exam section of a college. 4

    c) Explain the distinction among the terms primary key, candidate key, super key and foreign key with an example. 4

2. a) Consider the following database : 8
        Student(sid,name,age)
        Has(sid,cid)
        College(cid,cname)
        Write relational algebra expression to perform the following:
        i. Find average age of student
        ii. Display name of student who studies in "QWERT" college.
        iii. Insert a new student.
        iv. Delete record of "ASDFG" college from college relation.
        v. Display name of students whose name begin from 'S'.

    b) Consider the relational database 7
        Employee (empname, street, city)
        Works (empname, cmpname, salary) Company (cmpname, city)
        Manages (empname, cmpname)
        Write SQL statement to:
        i. Modify the database so that Amrit now lives in Naxal
        ii. Delete all tuples in the works relation for employee of xyz corporation
        iii. Increase salary of all employees of ABC company by 10%
        iv. Display all company name located at city Pokhara or Kathmandu

from the company tables.

    v.   Disply all empname who have salary grater than 5000 from works table

3. a) State and explain about functional dependency. Considering a suitable example.   7

<div align="center">

OR

</div>

What is normalization? Explain about BCNF and 4th normal forms in detail by takingexample.

  b) Define third normal form. Convert the following 2NF relation into 3NF(consider **Name** as primary key)   8

Name	Address	Phone	Salary	Post
Gill	KTM	456789	20000	Engineer
Van	BKT	654321	20000	Engineer
Robert	KTM	456789	20000	Engineer
Brown	BKT	654321	10000	Overseer
Albert	KTM	454545	10000	Officer

4. a) Is it necessary to manage security at OS level if security in database level is already done? Explain private key cryptosystem.   8

  b) What is query processing? Explain in detail each step involved in it   7

5. a) State and explain B- tree index. How indexes improves the performance of file storage?   8

  b) Describe about failure classification? Write down Differences between Deferred Database Modification and Immediate Database Modification.   7

6. a) What do you mean by a schedule? When schedule is called serializable? What are conflict serialization schedules?   8

  b) What is OODBMS. Discuss Distributed database along with necessary diagram.   7

7. Write Short notes on **any two:**   2×5

  a) Buffer management

  b) Multivalued Dependency

  c) Time-stamping based protocol

POKHARA UNIVERSITY

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) "Database approach is more appropriate than file-processing system for application development". Give reasons in the support of this statement.   8

    b) Define data model. Explain the different data model.   7

2. a) Consider the following relations for an order-processing database application in a company.   8

    CUSTOMER (Cust#,Cname, City)
    ORDER(Order#, Odate, Cust#, ord_Amt)
    ORDER_ITEM(Order#, Item#, Qty)
    ITEM(Item#, Unit_Price)
    SHIPMENT(Order#, Wavehouse#, Ship_date)
    WAREHOUSE(Warchouse#, City)

    Answer the following queries in relational Algebra

    i.   List the order# and ship date for all orders shipped from wavehouse number "W2"

    ii.   List the warehouse information for which the customer named 'Jose Copez' was supplied his orders

    iii. List the orders that werenot shipped within 30 days of ordering

    iv.   List the order # for orders that were shipped form all werehouses that the company has in network.

    b) What is Integrity constraint? How does data integrity Constraint differ with Data Security.   7

3. a) Consider the following relations: 8

Employee (emplD, FirstName, LastName, address, DOB, sex, position, deptNo)
Department (dtptNo, deptName, mgr, empID)
Project (projNo, projName, deptNo)
Work on (empID, projNo, hours worked)

Write the SQL statements for the following:

i. List the name and addresses of all employees who work for the IT department.

ii. List the total hours worked by each employee, arranged in order of department number and within department, alphabetically by employee surname.

iii. List the total number of employees in each department for those departments with more than 10 employees.

iv. List the project number, project name and the number of employees who work on that project.

b) What is integrity constraints? Explain with example about BCNF and 5th normal form.   7

4. a) Diagrammatically illustrate and discuss the steps involved in processing a query.   8

b) Explain the major issues related to Database security.   7

5. a) What is data dictionary storage? Explain Heap file organization.   8

b) What is file organization? Explain heap file organization with its advantages and disadvantages over index file organization.   7

6. a) What do you understand by concurrency control? Discuss two phase locking protocol. How does it guarantee serialization.   8

b) What is log-based re-covery? How is it different from shadow paging.   7

7. Write short notes on: **(Any two)**   2×5
   a) B-tree index file.
   b) Distributed DBMS.
   c) Natural join.

POKHARA UNIVERSITY

Level: Bachelor   Semester: Fall   Year   : 2013
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) The DBA controls the security aspects of the DBMS implementation. Discuss the software and hardware controls available to the DBA, and how this could fit into a commercial environment.   7

    b) What is super key and candidate key? Explain in brief about the structure of RDBMS.   8

2. a) What do you mean by relational algebraic operators? Explain all the basic operators with examples.   8

    b) Explain DDL and DML operations with suitable example.   7

3. a) State and explain in brief about multi-valued and joined dependencies.   8

    OR

    What is normalization? State and explain in brief about 4th and 5th normal form with suitable example.

    b) State ACID rules for concurrency control. Explain lock-based protocols.   7

4. a) What is integrity violation? Discuss the security levels that can be applied in DBMS.   8

    b) Define query optimization? Explain in brief about equivalence of expression.   7

5. a) Explain the structure of Index sequential file with the help of a diagram.   7

    b) What is stable storage? Explain in brief about shadow paging.   8

6. a) What is transaction? Describe the dead lock handling mechanism.   8

    b) Explain entity integrity and referential integrity. Also, give an example of each.   7

7. Write short notes on: (Any two)   2×5
   a) Data Dictionary.
   b) Distributed Model.
   c) Denormalization.

POKHARA UNIVERSITY

Level: Bachelor   Semester: Fall   Year   : 2014
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) List out the major objectives of DBMS. Differentiate between Data abstraction & Data independence.   7

   b) Draw an E-R diagram for the database of a hospital with a set of patients and a set of medical doctors. With each patient a log of the various tests conducted is also associated. Make your own assumptions if necessary.   8

2. a) What is relational algebra? Compare and contrast relational algebra with the relational calculus.   7

   b) Consider following relations: 8

      employee (emp_name, street, city)
      works (emp_name, company, salary)
      company (comp_name, city)
      manages (emp_name, manager_name)
      Write SQL statements for:

      i. Find employee names that lives in the city same as the company city.

      ii. List all employee details who earn more then 25000.

      iii. Update address of an employee 'Sriyash' to 'Pokhara'.

      iv. Create a view for which employee earns Rs. 20,000 or more.

      v. Delete all employees from the table employee.

3. a) Explain BCNF and 3NF with suitable example.   7

   b) Differentiate between authentication & authorization. How encryption & decryption occurs in Private key & Public key cryptography?.   8

4. a) How the query optimization process is carried out? Explain about cost   8

estimation of query.

b) When is it preferable to use a dense index rather than a sparse index? Explain with a suitable example.   7

5. a) Discuss in detail about the shadow paging technique of crash recovery with its drawbacks.   7

b) Define dead lock and serializability. Illustrate dead lock and conflict serializability with suitable example.   8

6. a) Under which situations will be beneficial to have replication or fragmentation of data? Explain with suitable example.   8

b) Define database integrity. Classify the integrity constraints of database.   7

7. Write short notes on: **(Any two)**   2×5

   a) Assertions and Trigger

   b) 2PL

   c) Stored procedure.