BTCS405

IV Semester Examination, May-June 2019

B.Tech / B.Tech + M.B.A. / B.Tech + M.Tech.
(CSE/CCE/CSE-CC/CSE-CMC/CSE-BDA/CSE-CYFS/IT)

Data Base Management System

Choice Based Credit System (CBCS)

Time: 3 Hrs.

Maximum Marks : 60

Minimum Pass Marks: 24

Note: (1) All questions carry equal marks, out of which part 'A' and 'B' carry 3 marks and part 'C' carries 6 marks.
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(3) Draw the neat diagram, wherever necessary.
(4) Assume suitable data, wherever necessary.

Q.1.(A) What is meant by DBMS? How does DBMS provide data abstraction? Explain. 03

(B) What is meant by data independence? Explain its significance. 03

(C) Explain the concept of a data model. What data models are used in database management systems? Explain. 06

OR

Consider a problem and draw an ER diagram for it. In an organization several projects are undertaken. Each project can employ one or more employees. Each employee can work on one or more projects. Each project is undertaken on the requirement of client. A client can request for several projects. Each project has only one client. A project can use a number of items and an item may be used by several projects.

Q.2.(A) What is meant by integrity constraints? Explain the different types of integrity constraints. 03

(B) What is meant by view? Write syntax to create a view. 03

(C) Consider the following database: Book (bid, book name, author, publisher)
Student (sid,student_name,department,admission_year),
Issue(sid,bid, issue_ date) ,
Write SQL statements for the following 06
    i.   List all the students whose name's second character is 'e'.
    ii.   List all the students who have issued the book in the month of June.
    iii.   List the number of students admitted in each department.
    iv.   List the name of student who has issue highest number of books
    v.   List the name of department in which admitted students are highest in year 2010.

Contd...

OR

What is Trigger? What are the types of triggers? Create a trigger on the following table Vehicle_Loan(vid,vprice,down_pay,Interest_rate,term,Interest,emi) so that the Interest and emi of loan amount is automatically inserted whenever a record is inserted in the table.

Q.3.(A) Differentiate the following
a) Primary index v/s secondary index
b) Sparse index v/s dense index

(B) What is query processing in DBMS? Does the data dictionary have any role to play in query processing?

(C) What is meant by file organization? What are the types of the file organization? Explain.

OR

What is meant by indexing? Mention the purpose of indexing. How it can be done by B+ tree?

Q.4.(A) What is transaction and explain its properties?

(B) Explain two phase locking with an example.

(C) Consider the universal relation
$R = \{A, B, C, D, E, F, G, H, I\}$ and the set of functional dependencies
$F = \{(A, B)\} \rightarrow \{C\}, \{A\} \rightarrow \{D, E\}$
$\{B\} \rightarrow \{F\}, \{F\} \rightarrow \{G, H\},$
$\{D\} \rightarrow \{I, J\}$ what is the key for R?
Decompose R into 2 NF, then 3 NF relations.

OR

What is Relational Algebra? Assume the following relations
Book(bid, title, publisher, year)
Student(sid, sname, branch, age)
Author(aid, aname, address)
Borrow(bid,sid,date)
Written(bid,aid)
Write the relational algebra expression for the following statements
a) List all books publish by McGraw-Hill before 1990
b) List the name of the students who are older than 23 and who are not studying in ME branch
c) List the names of all students who have borrowed a book and who are in IT branch
d) Find the name of the youngest student
e) List the authors of the books the student 'Rajesh' has borrowed.
f) Insert a new record in student relation and delete a record from book relation

Q.5.(A) What is meant by PCB mask in IMS? Explain.

(B) Explain the importance of database security. How do you provide database security? Explain.

(C) Explain object oriented database. What are the advantages of object oriented database over relational database? Explain.

OR

Explain XML database. Give XML representation of bank management system. Explain document type definition and XML schema.

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BTCS405

IV Semester Examination, December 2018

B.Tech. / B.Tech. + M.Tech. / B.Tech. + MBA [CCE/CSE-CMC/BDA/CYFS/IT]

Database Management System

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Q.1.(A) Explain the following :

(1) Difference between Network, Hierarchical and Relational Data Model

(2) Schema vs Instance

(3) Meta Data & Data Dictionary or Distribution Transparency.   03

(B) Explain the advantages of DBMS over File Organization System.   03

(C) Draw an EER diagram for the following Program: A non-profit Organization depends on a no of different types of persons for its successful operations the organization is interested in the following attributes for all of these Persons: SSN, NAME, ADDRESS, CITY / STATE / ZIP and Telephone. Three types of Persons are of greatest interest: employees, volunteers and donors. Employees only have a Date_Hired attribute and volunteers only have a skill attribute. Donors only have a relationship (named donates) with an Item entity type, A donor must have donated one or more items & an item may have no donors or one or more donors. There are Persons other than employees, volunteers & donors who are of interest to the organization so that a person need not belong to any of these three groups on the other hand, at a given time a person may belong to two or more of these groups (for ex. Employee & donor).   06

OR

A bank has 3 types of accounts Checking, Savings and Loan Following are the attributes for each type of account:

CHECKING: ACCT_NO, Date_Opened, Balance, Service _Charge.

SAVINGS: Acct_No, Date_Opened, Balance,I nterest _Rate.

LOAN: Acct_No, Date_Opened, Balance, Interest_Rate, Payment.

Assume that each bank account must be a member of exactly one of these subtypes. generalization, develop an EER Model segment to represent this situation. Remember include subtype discriminator?

Q.2.(A) Write the equivalent SQL for the following, (Assume the required Relation/Schema (if need

1. To retrieve the details of all the employes from EMPLOYEE table whose salary is great than the salary of employee "PRAVEEN", and whose name starts with the letter "S" a works in Management Department.

2. To Retrieve the details of all the person from "PERSON" table ,in the group of projects which they are working ,and whose salary is greater than maximum salary of perso "shashank", within the group only the details of those persons should appear whos maximum working hours is more than 12 Hours.(ONLY one Table is there "PERSON)

3. To display the name and salary of top three earners from EMPLOYEE table.

(B) Why we need to convert a SQL statement in RA? Write the equivalent RA expressions for the following query:

SELECT d.dept_id,e.max (sal),e.eid FROM Dept D,Emp E Where e.eid=d. dept-id group by (d.dept_id,e.e_id) having min (sal) > 55000,

(C) Explain the difference between following with a suitable example:

(1) TRC & DRC

(2) Natural & Inner Join

(3) Intension and Extension

(4) System R

(5) Dual Table in Oracle

(6) Table space & Redo-log Files

OR

How does a query tree represent a RA expression? What is mean by an execution of a query tree? Discuss the cost based and heuristics query optimization.

Q.3.(A) Discuss the techniques for allowing a hash file to expand and shrink dynamically. What are the advantages and disadvantages of each?

(B) How does B- to a tree differ from a B+- tree? Why is a B+ -tree usually preferred as an access structure data file?

(C) What are the differences between Primary, Secondary, & clustered indexes? How these differences do affects the ways in which these indexes are implemented? Which of these indexes are dense and which are not?

OR

Define Main goals of RAID technology. How does it achieve them? How does disk Mirroring help improve reliability? Explain with an Example.

BTCS405

IV Semester Examination, May 2018

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Q.1.(A) Justify the statement with example – "Database Management System are better than file processing Approach".   03

(B) Describe the architecture of database system.   03

(C) Describe the terms Entity and Relationship in E-R model. Draw and explain ER model for database design of an university system.   06

OR

Variety of data models can be used for data base design. Explain prominent models with example.

Q.2.(A) Distinguish and describe various data constraints in MYSQL.   03

(B) Explain various DDL and DML commands in structured query language.   03

(C) Schema defined for employee management system is:-

Employee:- EmpID, Name, Address, Department, Designation, Salary.

Department:- Dept ID, Name, HeadID.

Write SQL Queries for the following and show the results:-

a) Retrieve the details of employees who gets the maximum salary.

b) List names of all employees who earn more than R. 100000 in a year.

c) Give the name of the employee who heads the department where employee with EMPID3 works.   06

OR

Consider the following table:-

Employee (EMP_Name, Dept_Name, Salary)

Write SQL statements for the following:-

a) Find the department which has the highest average salary.

b) Find all departments where more than 60 employees are working.

c) Find the name of employees whom salary are higher than the average salary of department.

Q.3.(A) Describe the basics steps involved in query processing.

(B) Explain as how records of file are placed and organized into a file in secondary storage.

(C) Define hashing. Consider the keys 20, 15, 12, 2, 3, 8, 5 and 19 are inserted into an initially empty hash table of length 10 using open addressing with hashfunction $h(k) = k \mod 10$ and linear probing. What is the resultant hash table?

OR

Define B-TREE .Construct B+ Tree to insert the following key values(order of 3).
32, 11, 15, 13, 22, 15, 44, 67, 4

Q.4.(A) Describe transactions and ACID properties of transactions briefly.

(B) Discuss :   (a) Lock based protocol   (b) Time stamp protocol

(C) Define normalization. Explain 1NF, 2NF, 3NF and BCNF with suitable examples.

OR

Define lossless and lossy decomposition. Consider relation R(A, B, C, D, E) and find out the candidate key and highest normal form .

      A B-> CD

      CD -> EF

      D -> B

      BC -> DEF

      CE -> F

Q.5.(A) Explain the architecture of Information Management System in brief.

(B) Write short notes on (Any two):

    a. Object Oriented Database

    b. Program Communication Block

    c. Data Warehousing

(C) Describe the steps involved in data mining process.

OR

Describe Distributed Database. Differentiate between a homogenous distributed database and heterogeneous distributed database.

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BTCS411

IV Semester Examination, May – June 2022
B.Tech./B.Tech.+M.B.A./B.Tech.+M.Tech.(CSE,CCE,CSE-BDA,CSE-CF,CSE-CC,CSE-CYFS,BDCE-Impetus,CSE-ICS,CSE-MA,CSE-ES,CSE-DSI,CSE-FSDI,IT)

Data Base Management System

Choice Based Credit System (CBCS)

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Draw neat diagram, wherever necessary.
Assume suitable data wherever necessary.

Q.1(A) What do you mean by data modeling? Compare Hierarchical Model and Network Model.   03

(B) Explain the concepts of Generalization and Aggregation with appropriate examples.   03

(C) Draw an ER diagram for marketing company database.   06

OR

Explain following rules for ER Diagram to Relational Table conversion.

Q.2(A) Explain Super key, primary key, candidate key with examples.   03

(B) Explain the characteristics of relation. Also explain relation database.   03

(C) Explain select, project and division operations with examples.   06

OR

Explain inner join , right join , left join with examples.

Q.3(A) What are integrity constraints? Explain various types of integrity constraints with suitable example.   03

(B) Write a brief note on trival and non-trival dependencies.

Consider the following employee database:-

- employee (empname, street, city)
- work (empname, companyname, salary)
- company (companyname, city)
- manages (empname, management)   03

(C) Give an expression in the SQL for each statement:

1. Find the names of all employees who work for first Bank corporation.
2. Find the names, street address and cities of residence of all employees who work for first Bank corporation and earn more than 200000 per annum.
3. Find the names of all employee in this database who live in the same city as the company for which they work.

06

OR

Consider the relation schema R(A,B,C) with FD's AB->C and C->A. show that the schema R is in 3 NF but not in BCNF. Also determine keys of R.

Q.4(A) What problems occur in the database when transactions do not satisfy ACID properties?

03

(B) Explain various transaction states with their description. Also discuss its state diagram.

03

(C) Explain types of Serializability in transaction management.

06

OR

How Concurrency is performed? Explain the protocol that is used to maintain the concurrency concept.

Q.5(A) Explain the concept of Distributed Database Management System.

03

(B) Explain the concept of searching via an index.

03

(C) Explain types of Single-Level Index

06

OR

Explain Database Backup and Recovery process.

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Draw neat diagram, wherever necessary.
Assume suitable data wherever necessary.

Q.1(A) Write Short notes on:

(1) Data Models (2) Schema & Instance (3) Function of DBA   03

(B) Why Data Independence is necessary, Justify Your Answer with Proper
Explanation?   03

(C) Explain the Different components of DBMS Architecture by drawing a suitable
diagram?   06

OR

Explain the concept of Generalization and specialization in Extended ER
diagram with an example; also show the different Design constraints in
Extended ER diagram?

Q.2(A) Define the following:

(1) Intension & Extension (2) Aggregate Functions (3) Cartesian product   03

(B) Why Join Operations are required in DBMS? Briefly Explain the various types
of Join.   03

(C) Explain the Fundamental operations of Relational algebra. Also explain the
term Relational query Language.   06

OR

Differentiate between free and bound variables Also explain the safe
Expression in Relational calculus?

Q.3(A) Write short Notes on following:

    I.   Stored Procedure & Trigger

    II.   Key Constraints

    III. Multivalued Dependency   **03**

(B) Why its needed in DBMS, to convert a Relation into a well structured Relation?   **03**

(C) If a relation schema is in BCNF then it is in 3NF, but if a relation schema is in

    3NF then it is not necessary in BCNF. Justify your answer with an Example?   **06**

<div align="center">OR</div>

Explain the 5NF with an Example?

Q.4(A) Explain the concept of Locking. What are different modes of locking?   **03**

(B) Why Query Optimization is required? Explain the cost based Query

    optimization Technique.   **03**

(C) Explain the various concurrency control Techniques.   **06**

<div align="center">OR</div>

Explain Recovery process after system failure using checkpoint?

Q.5(A) Explain the following terms with suitable example.

    (1) DCL statement (2) Group by clause (3) TCL statement.   **03**

(B) Why can we have at most one primary or clustering index on a file but several

    secondary Indexes, Explain?   **03**

(C) What is B* tree? Explain Insertion and Deletion operations with Example.   **06**

<div align="center">OR</div>

Explain hashed File Organization in Detail.

<div align="center">*******</div>

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Draw neat diagram, wherever necessary. ·

Assume suitable data wherever necessary.

Q.1(A) Define the term Database Management System also explain its advantages and disadvantages. 03

(B) Write commands of DDL with examples. 03

(C) Explain the network model and hierarchical model with example. 06

OR

Explain the three-level architecture of DBMS.

Q.2(A) Explain generalization with example. 03

(B) Consider the following relational database schema consisting of the four relation schemas:

1. passenger (pid, pname, pgender, pcity)
2. agency (aid, aname, acity)
3. flight (fid, fdate, time, source, destination)
4. booking (pid, aid, fid, fdate)

Answer the following questions using relational algebra queries:

I. Get the complete details of all flights to New Delhi.

II. Get the details about all flights from Chennai to New Delhi.

III. Find the passenger names for passengers who have bookings on at least one flight. 03

(C) Suppose you are given the following requirements for a simple database for the National Hockey League (NHL)- the NHL has many teams, each team has a name, a city, a coach, a captain, and a set of players, each player belongs to only one team, each player has a name, a position, a skill level, and a set of injury records, a team captain is also a player, a game is played between two teams (referred to as host team and guest team) and has a date and a score. Construct a clean and concise ER diagram for the NHL database.   **06**

OR

Explain integrity constraints and their types in DBMS.

Q.3(A) Consider relation E = (P, Q, R, S, T, U) having set of Functional Dependencies (FD).

$P \rightarrow Q$	$P \rightarrow R$
$QR \rightarrow S$	$Q \rightarrow T$
$QR \rightarrow U$	$PR \rightarrow U$

Calculate some members of Axioms are as follows:
1) $P \rightarrow T$ 2) $PR \rightarrow S$ 3) $QR \rightarrow SU$ **03**

(B) Write the difference between lossless and lossy decomposition.   **03**

(C) Explain normalization. Is BCNF is a stronger normal form than 3NF? Mention reason.   **06**

OR

Explain query processing and query optimization. Also discuss the execution strategy of query optimization with diagram.

Q.4(A) Explain dense index and multilevel index.   **03**

(B) Define concurrency control technique. Explain problems in concurrency control.   **03**

(C) What do you mean by transaction processing? Explain ACID properties of transaction.   **06**

OR

What is two-phase locking and how does it guarantee serializability?

Q.5(A) Write difference between data warehouseand data mining.   **03**

(B) Explain object-oriented database.   **03**

(C) Write short note on web databases and distributed databases.   **06**

OR

Explain immediate update and deferred update of recovery techniques

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