

END TERM EXAMINATION

SECOND SEMESTER [BCA] MAY-2008

Paper Code:BCA-110

Subject: Database Management Systems

Paper Id: 20110

Batch (2005-2007)

Time : 3 Hours

Maximum Marks :75

Note: Q1. is compulsory. Rest of the questions have internal choice.

Q1.

(2.5 x 10=25)

- (a) Differentiate between physical data independence and logical data independence.
- (b) What is spanned record organization?
- (c) State various relational database design guidelines.
- (d) Illustrate normalization.
- (e) Differentiate between composite & derived attributes.
- (f) Distinguish between Primary key, candidate key & super key.
- (g) Define referential Integrity constraint.
- (h) How do you get 3NF from 2NF?
- (i) Explain Hashing.
- (j) Define Audit Trail.

Q2.

What is timestamp? How does system generate timestamps?

(10)

OR

Write down all the steps of Entity Relationship to Table mapping.

(10)

Q3.

(a) What is deadlock & how can it be prevented?

(5)

(b) What is 2 phase locking and 2 phase commit protocols.

(5)

OR

What is an ER diagram? How is EER different from E-R model. Construct an ER diagram for banking enterprise covering all major activities.

(10)

Q4.

Explain different mechanism of concurrency control. Define Pros & cons of each.

(10)

OR

Illustrate in detail about all Raid level.

(10)

Q5.

What is a join? Write all categories of joins (theta join, equi join, outer join, self join).

(10)

OR

Consider a relation schema R(a, b, c, d, e, f) having functional dependencies.

(10)

A b → c

b → a

d → c

e → af

f → a

Normalise this relation upto 3NF.

Q6.

Write SQL queries for:

(10)

Fname	Lname	SSN	Address	Salary	DNO
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(i) Retrieve first name, Last name of employees who work in Department number 5.

(ii) Retrieve the employees whose salary is greater than 5000.

OR

Write SQL statements for the following table;

(10)

Customer

Cust_id	Lname	Fname	Area	Phone
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Movie

Mv_no	Title	Type	Star	Price
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Invoice

Inv_no	Mv_no	Cust_id	Issue_date	Return_date
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(a) Display the invoice information for customer 'a01' & 'a02'.

(b) Find the movies of type "horror" and Comedy.

(c) Print the information from invoice table of customer who have been issued movies in the month of September.

END TERM EXAMINATION

SECOND SEMESTER [BCA] MAY- JUNE 2007

Paper Code:BCA-110

Subject: Database Management Systems
(2005-2006 Batch)

Time : 3 Hours

Maximum Marks : 75

Note: Attempt all questions. Question No. 1 is compulsory. Rest of the questions have internal choice.

Q1. (a) Define the following terms briefly: (1x15=15)

- (i) Data Independence
- (ii) Derived Attribute
- (iii) Recursive Relationship
- (iv) Foreign Key
- (v) Weak Entity
- (vi) Super Key
- (vii) Normalization
- (viii) Functional Dependency
- (ix) Transitive Dependence
- (x) B⁺ Trees
- (xi) Deadlock
- (xii) Theta Join
- (xiii) Database Administrator
- (xiv) Referential Integrity Constraint
- (xv) Time Stamp Ordering.

(b) Fill in the blanks: (1x10=10)

- (i) DBMS provides a set of operations or language for creating and manipulating data called _____ and _____.
- (ii) _____ is the process of defining a set of subclasses of an entity type.
- (iii) A weak entity type can be made strong by including the _____ of its owner entity, such a relation is known as _____.
- (iv) Join operation can be implemented by performing _____ operation after _____ operation.
- (v) Decomposition should both be _____ and _____.
- (vi) A transaction reaches its _____ point when all its operations, that access the database have been executed.

Q2. Discuss in detail the three tier architecture for a DBMS explaining data formats in each level. Explain Data Independence and its types. (12.5)

OR

an ER diagram for student Information System' in an institution.
ate the assumptions while designing the system. List the entities,
nip, attributes involved in it and various constraints on the
ships. (12.5)

(a) Discuss briefly the Relational Model. Describe the various integrity constraints. (6.5)

(b) Explain the various types of Join operations with example of each type.
What is the relation between Join operation and Cartesian product. (6)

OR

Q.5 Given the following tables, write SQL queries for the following:

Tables

Account (Account number, Branch_Name, Balance)

Branch (Branch Name, Branch_City, Assets)

Customer (Customer Name, Customer_Street, Customer_City)

Depositor (Customer Name, Account Number)

Loan (Loan number, Branch_Name, Amount)

Borrower (Customer Name, Loan Number)

(i) Find the customer names, loan numbers and loan amounts for all loans at the 'Delhi' branch.

(ii) Find the average account balance at each branch.

(iii) Find the number of depositors in each branch.

(iv) Find the branch having the highest balance.

(v) Find the names of customers having more than 2 accounts. (12.5)

Q6. Explain the process of hashing. Discuss various methods of collision resolution. List all desirable properties of a good hashing function. (12.5)

OR

Q7. Explain, what is an Indexed Sequential File? How can B⁺ tree be used to construct an index? (12.5)

Q8. Explain, why Normalization is done in Databases? Explain in detail 1NF, 2NF and 3NF with examples for each. (12.5)

OR

Q9. Write short notes on the following: — (2.5x5=12.5)

(i) Dirty Read Problem.

(ii) Schedule serializability

(iii) Relational Algebra

(iv) Two phase Locking

(v) Check points in Database log files

108 3

END-TERM EXAMINATION

SECOND SEMESTER [BCA] MAY-JUNE 2006

Paper Code: BCA- 110

Subject: Database Management Systems

Paper ID: 20110

Time : 3 Hours

Maximum Marks : 75

Note: Attempt all questions. Question No. 1 is compulsory. Rest of the questions have internal choice.

- Q1. (a) Define the following terms/concepts in one or two sentences: (1x15=15)
- (i) Program-data independence
 - (ii) Complex attributes
 - (iii) Hashing
 - (iv) Referential Integrity Constraint
 - (v) B+ Tree
 - (vi) Candidate key
 - (vii) Natural Join
 - (viii) Functional dependency
 - (ix) Third Normal Form
 - (x) Dirty Read Problem
 - (xi) Basic Time stamp ordering
 - (xii) Deadlocks
 - (xiii) Chickpoint
 - (xiv) Audit Trail
 - (xv) System Log
- (b) Fill in the blanks: (1x10=10)
- (i) The data in the database at a particular moment in time is called a _____.
 - (ii) The process of transforming requests and results between various levels of a three-schema architecture is called _____.
 - (iii) Data can be grouped using the _____ and _____ clauses in SQL.
 - (iv) _____ of a relationship type is the number of participating entity types and called a relationship type of degree two _____ and a relationship type of degree three _____.
 - (v) A _____ model can represent a one-to-many relationship between two entities where the two are respectively parent and child.
 - (vi) _____ is the mechanism that is applied to ensure that the data in the database is correct and consistent.
 - (vii) A _____ is an atomic unit of work that's either completed in its entirety or not done at all.

- Q2. Enlist and further explain the benefits achieved by using a database approach. Also, discuss the capabilities that a good DBMS might possess. (12.5)

OR

Design an ER-diagram for a railway reservation system. Clearly, state the assumptions you would consider while designing the system. List the entities, relationships, attributes involved in it and finally design the ER-diagram with all role names included and with structural constraints on relationships specified.

12

[-2 -]

- Q3. When does collision occur in internal hashing? Discuss several methods for collision resolution. Further, discuss the goal of a good hashing function. (12.5)

OR

Discuss the implementation of extendible hashing. Illustrate the concept of bucket splitting in it. Further discuss the advantages and disadvantages of using such a scheme.

- Q4. Consider the following database schema for a hotel:- (12.5)
Employee (Emp_No, Name, skill, Wages)
Duty allocation (Posting_No, Emp_No, day, shift)
Specify the following queries in SQL :-

- (a) Get the list of employees who are waiter or working at posting No 321.
- (b) Find the names and wages of all the employees who are allocated a duty.
- (c) Get the total number of different employees working in each shift.
- (d) Retrieve the shift details for an employee named Amit.
- (e) Get a list of names of employees with the skill of a chef who are assigned a duty.

OR

Design an EER schema for a university database. Specify all constraints that should hold on the database. Make sure that the schema has at least five entity types, four relationship types, a super-class/subclass relationship and a category.

- Q5. Consider the relation R, which has the attributes that hold the details regarding books and members of a library. (12.5)

$R = \{ \text{Memb_code, memb_Name, Contact, Book_code, Category_code, Issued_date, Return_date} \}$

Suppose the following functional dependencies hold:

$\{ \text{Memb_code} \} \rightarrow \{ \text{Memb_Name, contact} \}$

$\{ \text{Book_code} \} \rightarrow \{ \text{Category_code} \}$

$\{ \text{Memb_code, Book_code} \} \rightarrow \{ \text{Issue_date, Return_date} \}$

Determine the sets of attributes that form the keys of R. Further, apply normalization until you cannot decompose the relations further. State the reasons behind each decomposition.

OR

Write short notes on the following:-

- (a) Lost update problem
- (b) ACID properties of transactions
- (c) Role of a Database Administrator
- (d) Data Encryption
- (e) Two-phase commit protocol.
