

4. Attempt any two:

a What is query evaluation plan? Explain Query Optimization in detail. 5
06

b How does a query tree represents a relational algebra expression? 4
06

c Explain ACID properties of database system which are maintained to ensure the integrity of data? 02

d What is shadow copy technique? 10
02

e What are approaches of deadlock prevention? 02

f What are b-link trees? 02

g What is concurrency control? 02

h What is two phase locking? 02

i How does DBMS ensures that transactions are executed properly? 02

Fifth Semester B. Tech. (CS / IT)

Winter – 2016

Course Code: ITU502

Course Name: Database Management System

Time: 2 hr. 30min.

Max. Marks: 60

Instructions to Candidate

- 1) All questions are compulsory.
- 2) Assume suitable data wherever necessary and clearly state the assumptions made.
- 3) Diagrams/sketches should be given wherever necessary.
- 4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
- 5) Figures to the right indicate full marks.

1. Attempt any two:

a Design a generalization-specialization hierarchy for a motor-vehicle sales company. The company

sells motorcycles, passenger cars, vans and buses. Justify your placement of attributes at each level of the hierarchy. Explain why should not be placed at a higher or lower level?

b What is use of mapping cardinalities? For a binary relationship set R between entity set A & B list & explain types of mapping cardinalities.

5
06

c With the help of diagram explain all three levels of data abstraction. Explain how data abstraction simplifies user's interaction with the system?

5
06

relational algebra –

account(branch-name, account-number, balance)
coustomer(coustomer-name, coustmer-street, coustomer-city)

depositor(customer-name, account-number)
loan(branch-name, loan-number, amount)

borrower(coustomer-name, loan-number)

- a) Find the names of all the coustomer who have an account but not a loan
- b) Find all coustomer of the bank who have either an account or a loan or both
- c) Find all loan number and the amount of the loan

b Explain following relational algebra operation with the help of example:
5

- a) The Set-Intersection operation
- b) Natural Join operation

3. Attempt any two:

06

a List and explain parts of SQL language

4
06

b Write short note on:

- 1) Assertion
- 2) Trigger

5
06

c With the help of example explain following normal forms:

- 1) First Normal form
- 2) Second Normal form
- 3) Third Normal form

transactions. Explain following concurrency control protocol.

- 1) Lock based protocols
- 2) Time stamp based protocols

b) Choose Correct Option:

1] which of the following makes the transaction permanent in the database. 1M

- a) View
- b) Commit
- c) Rollback
- d) Flashback

2] In a relational schema , each tuple is divided into fields called 1M

- a) Relation
- b) Domains
- c) Queries
- d) schema

3] Foreign key is the one in which the _____ of one relation is referenced in another relation. 1M

- a) Foreign key
- b) Primary key
- c) References
- d) Check constraint

4] Which of the following has "all-or-none" property ?

1M

c) isolation

d) All of the above

5] If a transaction acquires a shared lock, then it can perform operation.

1M

- a) read
- b) write
- c) read and write
- d) update

6] Type of attributes that can be divided into smaller parts is classified as

1M

- a) multivalued attributes
- b) single valued attributes
- c) composite attributes
- d) atomic attributes

Government College of Engineering, Amravati
(An Autonomous Institute of Government of Maharashtra)

V Semester B. Tech. (Information Technology)

Winter – 2017

Course Code: ITU502

Course Name: Database Management System

Time: 2 Hrs. 30 Min.

Max. Marks: 60

Instructions to Candidate

- 1) All questions are compulsory.
- 2) Assume suitable data wherever necessary and clearly state the assumptions made.
- 3) Diagrams/sketches should be given wherever necessary.
- 4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
- 5) Figures to the right indicate full marks.

Solve Any Two:

1.
a) Explain Data Definition Language, Data Manipulation Language and Data Control Language. With the help of SQL commands. **6M**
 - b) Define basic structure of SQL query. Write equivalent relational algebra expression for SQL query. **6M**
 - c) List & Explain SET operations in SQL. **6M**
2. **Solve:**
- a) What is View? Write SQL CREATE VIEW **6M**

statement. Give importance of VIEW.

b)

Draw relational database structure. List & Explain fundamental operations in relational algebra.

3.

Solve Any Two:

a)

What is binary relationship? Explain all type of mapping cardinalities in binary relationship with example.

b)

List & Explain properties of 1st,2nd,3rd normal form with the help of example.

c)

State how relational calculus query is converted to relational algebra query in query decomposer?

4.

Solve:

a)

State importance of Wait-for Graph method of Deadlock Avoidance

b)

Write short note on:

1) Referential Integrity

2) Domain Constraints

c)

What do you mean by storage structures? Explain B+ Trees

5.

Solve :

a)

Give the importance of concurrency control in

6M

(b) Explain why 4NF is a normal form more desirable than BCNF.

Consider the following relational database:

~~employee (employee-name, street, city)~~

~~works (employee-name, company-name, salary)~~

~~company (company-name, city)~~

~~manages (employee-name, manager-name)~~

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

4.

~~(a)~~

What are the steps in query processing?

6

(b) What is query optimization? Explain with example.

6

5.

~~(a)~~

Compare the deferred- and immediate-modification versions of the log-based recovery scheme.

6

During its execution, a transaction passes through several states, until it finally commits or aborts.

List all possible sequences of states through which a transaction may pass. Explain why each state transition may occur.

V Sem. B. Tech. (CS/IT)

Winter - 2015

Course Code: ITU502

Course Name: Database Management System

Time: 2 hr. 30min.

Max. Marks: 60

Instructions to Candidate

- 1) All questions are compulsory.
- 2) Assume suitable data wherever necessary and clearly state the assumptions made.
- 3) Diagrams/sketches should be given wherever necessary.
- 4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.

1. Attempt any two of the following

12

(a) Design a relational database for a university registrar's office. The office maintains data about each class, including the instructor, the number of students enrolled, and the time and place of the class meetings. For each student-class pair, a grade is recorded.

(b) Define the concept of aggregation. Give two examples of where this concept is useful.

(c) What are five main functions of a database administrator?

12

2. Attempt any two of the following

(a) Consider the employee database given below, where the primary keys are underlined. Give an expression in SQL for each of the following queries.

Cont.

employee (employee-name, company-name, salary)

works (employee-name, company-name, salary)

company (company-name, city) city street

manages (employee-name, manager-name)

- i. Find all employees in the database who live

in the same cities as the companies for which they work.

- ii. Find all employees in the database who live in the same cities and on the same streets as do their managers.

- iii. Find all employees in the database who do not work for First Bank Corporation.

Consider the employee relational database, where the primary keys are underlined.

Give an expression in the relational algebra to express each of the following queries:

- i. Find the names of all employees who work for First Bank Corporation.

- ii. Find the names and cities of residence of all employees who work for First Bank Corporation.

iii. Find the names, street address, and cities of residence of all employees who work for First Bank Corporation and earn more than \$10,000 per annum.

What are the aggregate functions in SQL? Explain each with example

3.

12

(a) Attempt any two of the following

Compute the closure of the following set F of functional dependencies for relation schema

$$R = (A, B, C, D, E).$$

$$A \rightarrow BC$$

$$CD \rightarrow E$$

$$B \rightarrow D$$

$$E \rightarrow A$$