

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**B. E. - SEMESTER – VII • EXAMINATION – WINTER 2012**

**Subject code: 171602****Date: 27/12/2012****Subject Name: Distributed Database Application & System****Time: 10.30 am - 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What is query processing in a relational database? Explain in detail with an example. How does it differ from distributed query processing? **07**
- (b) Explain Levels of data and process distribution in distributed environment. **05**
- (c) What is site autonomy in distributed DBMS? Explain in brief. **02**

- Q.2** (a) What is distributed transaction and how does it differ from remote transaction? Explain with an example. **04**
- (b) Under which situations will it be beneficial to have replication or fragmentation of data? **03**
- (c) Consider a relation that is fragmented horizontally by *plant-number*: **07**  
employee (name, address, salary, plant-number)

Assume each fragment has two replicas (1) stored at the New York site (2) locally at the plant site.

Describe a good processing strategy for the following queries entered at the San Jose site.

- a. Find all employees at the Boca plant.
- b. Find the average salary of all employees.
- c. Find the highest-paid employee at each of the following sites: Toronto, Edmonton, Vancouver, Montreal
- d. Find the lowest-paid employee in the company

**OR**

- (c) Consider a failure that occurs during 2PC for a transaction. For each possible failure, explain how 2PC ensures transaction atomicity despite the failure? **07**

- Q.3** (a) Explain view management in centralized as well as distributed DBMS. **06**
- (b) Explain the following terms: **04**  
(i) Fragmentation transparency  
(ii) Replication transparency
- (c) Explain Client/Server database architecture. **04**

**OR**

- Q.3** (a) Consider the following relation **06**  
employee (person-name, street, city)  
works(person-name, company-name, salary)  
company(company-name, city)  
manages(person-name, manager-name)

Write following query in relational algebra form.

- (1) Find names of all employees who work for First Bank Corporation (FBC).
- (2) Find the names of all employees who live in the same city as the company for which they work.
- (3) Find names, street addresses and cities of residence of all employees who

work for FBC and earn more than \$10,000 per year

- (b) Distinguish between tightly coupled and loosely coupled systems. **04**  
(c) Explain Reference architecture of DDBMS with proper diagram. **04**
- Q.4** (a) Explain top-down and bottom-up design strategies. **07**  
(b) What do you mean by query optimization? Explain System R (centralized) query optimization algorithm. **07**
- OR**
- Q.4** (a) Differentiate individual assertion and self-oriented assertion and how to enforce these assertions in DDBMS? **07**  
(b) Explain peer-to-peer distributed systems. **07**
- Q.5** (a) What are the major Distributed DBMS components? Explain each in detail with proper diagram. **07**  
(b) Explain various transaction states and properties in detail. **07**
- OR**
- Q.5** (a) What is authorization control? How do imply authorization control in a distributed environment? **07**  
(b) Differentiate between partitioned and replicated databases. Discuss the fundamental issues while designing a distributed database. **07**

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