

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**MCA - SEMESTER– II EXAMINATION – SUMMER 2015**

**Subject Code:620006****Date:01/06/2015****Subject Name: Database Management Systems - II****Time:10:30 am - 01:00 pm****Total Marks: 70****Instructions:**

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

**Q.1 (a) Fill in the blanks:****07**

1. \_\_\_\_\_ is the process of managing simultaneous execution of transactions in a multiprocessing database system without having them interfere with one another.
2. \_\_\_\_\_ recovery is performed when there is a head crash on the disk.
3. \_\_\_\_\_ is the process of a granting of right or privilege to the users to have a legitimate access to a system or objects of the system.
4. An \_\_\_\_\_ is an abstract representation of a real world entity that has a unique identity, embedded properties and the ability to interact with other objects and itself.
5. \_\_\_\_\_ is an attribute, or set of attributes, that uniquely identifies a tuple within a relation.
6. In \_\_\_\_\_ stage, the query is converted into normalized form that can be more easily manipulated.
7. Atomicity is handled by a component called the \_\_\_\_\_.

**(b) State True / False:****07**

1. The REDO operation updates the database with new values that is stored in the log.
2. In the two-phase locking, every transaction is divided into the growing phase and the shrinking phase
3. Usually, heuristic rules are used in the form of query tree or query graph data structure.
4. In a reality, NULL is not a value, but rather the absence of value.
5. Shadow paging technique requires the use of transaction login a single-user environment.
6. A domain is a set of atomic values.
7. A deadlock in a distributed system may be either local or global.

**Q.2 (a) Define the following terms:****07**

1. Foreign Key
2. Query Processing
3. Timestamp
4. Checkpoint
5. Discretionary Access Control
6. Locking
7. Firewalls

- Q.2 (b)** 1. What is optimistic method of concurrency control? Discuss different phases. Also list out the advantages, problems and applications of the same. **07**
- OR**
- Q.2 (b)** 1. What is buffer? Explain the buffer management technique used in database recovery. **04**  
2. What do you mean by firewall? What are the firewall techniques that are used in database security? **03**
- Q.3 (a)** Discuss in detail the types of access control techniques used in database security system **07**  
**(b)** Describe the shadow paging recovery technique. Under what circumstances does it not require a transaction log? List the advantages and disadvantages of it. **07**
- OR**
- Q.3 (a)** What is Locking? Discuss different types of locks. **07**  
**(b)** Define database recovery. Discuss the types of database recovery with diagrams. **07**
- Q.4 (a)** Explain key elements of parallel database processing. **07**  
**(b)** What is DDBS? Neatly with sketch explain its types. **07**
- OR**
- Q.4 (a)** Discuss various architectures of distributed databases. **07**  
**(b)** What do you mean by relational algebra? Discuss all the operators of relational algebra. **07**
- Q.5 (a)** What are query transformation rules? Discuss the rules for transformation of query trees and identify when each rule should be applied during optimization. **07**  
**(b)** What cost components are used often for cost functions? List the cost functions for the SELECT and JOIN operations. **07**
- OR**
- Q.5 (a)** Write short notes on: **07**  
1. Pipelining and Materialization  
2. Query Decomposition  
**(b)** Discuss structure of query execution plans. **07**

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