

GUJARAT TECHNOLOGICAL UNIVERSITY**M. C. A. Semester - IST Examination –July- 2011****Subject code: 610005****Subject Name: Database Management Systems-I****Date:13/07/2011****Time: 02:30 pm – 05:00 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** Define the following in terms of DBMS analogy. **14**
1. Atomicity
 2. Durability
 3. Redundancy
 4. Relationship set
 5. Composite attributes
 6. Superkey
 7. Mapping cardinalities
 8. Throughput
 9. Unique constraints
 10. Spurious tuples
 11. Nonadditive join
 12. Prime, nonprime attribute
 13. DKNF
 14. System catalog
- Q.2** (a) Give architectural specification of various components of a database system. **07**
- (b) What is aggregation? Explain the use of aggregation with specific example. **07**
- OR**
- (b) Define DBA? Which tasks are performed by DBA? **07**
- Q.3** (a) In designing a relational database, why might we choose a non-BCNF design? **07**
- (b) What undesirable dependencies are avoided when a relation is in 2NF and in 3NF? **07**
- OR**
- Q.3** (a) Distinguish between the DBMS and File Processing System. **07**
- (b) Define Normalization. Explain with general example for 1NF, 2NF, 3NF, and BCNF. **07**
- Q.4** (a) Explain with an example. How can binary decompositions for the nonadditive join property be tested easily? **07**
- (b) 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 they should not be placed at a higher or lower level. **07**

OR

- Q.4** (a) A relational schema ADDR is defined with attributes Name (Unique), House Number, Street, City, State and Zip Code. For any given Zip Code, there is just one city and one State. Also, for any given Street, City and State, there is just one Zip Code. First, define the FDs for this relation. Then, give a minimum set of FDs for this relation. List the candidate keys. **07**
- (b) Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted. **07**
- Q.5** (a) Why can we not guarantee that BCNF relation schemas will be produced by dependency-preserving decompositions of non-BCNF relation schemas? Give a counter example to illustrate this point. **07**
- (b) Use Armstrong's axioms to prove the soundness of the decomposition rule. **07**

OR

- Q.5** (a) List three design goals for relational databases, and explain why each is desirable. **07**
- (b) List two advantages and two disadvantages of each of the following strategies for storing a relational database: **07**
- 1) Store each relation in one file.
 - 2) Store multiple relations (even the entire database) in one file.
