

Special Examinations, 2012  
RELATIONAL DATABASE MANAGEMENT SYSTEM  
Full Marks:70  
Time: 3 Hours

Answer six questions including question No.1 which is compulsory  
Figures in the right hand margin indicate marks

1. Answer the following questions 2x10
- (a) Why do we need indexes in databases?
  - (b) What is the difference between multivalued and derived attributes ?
  - (c) Describe the disk access characteristics. Why are they especially important for databases?
  - (d) What is generalization? How it differs from specialization?
  - (e) What is a Object oriented data model?
  - (f) Explain one of the pessimistic concurrency control scheme with example.
  - (g) What is the difference between REDO and UNDO operation ?
  - (h) Explain functional dependence.
  - (i) What do you mean by serializability in transaction processing ?
  - (j) Draw the E-R diagram for the following entity sets Movies (title, year, length, filmtype) and Stars (name, address).
2. (a) List at least four advantages of using a database management system over a traditional file management system. Are there any disadvantages of DBMS?

- (b) What are the main steps in database design? Explain them in brief. 5
3. (a) Draw the E-R diagram for the following relations : 5
- Courses (number, room) – it is a weak entity set.
- Depts (name, HOD.)
- Lab courses (computer allocation)
- Theory Courses (name, faculty\_name)
- (b) What is normalization? Explain the first and second normal forms using appropriate examples. 5
- 4.(a) What SQL construct\* enables the definition of a relation? What construct allow the modification of relation instances 5
- (b) Consider the three relations given below:
- Order (Order\_no, Order\_date, Customer\_no)
- Order\_item (Order\_no, Item\_no, quantity, Bill\_amount)
- Item (Item\_no, Item\_name, Unit\_price)
- State whether the following relations are in 3NF or not, if not, then what steps you should follow to bring those into 3NF. 5
5. (a) Define Transaction. Explain different states of a Transaction. Differentiate between chained transaction and nested transaction. Discuss their advantages and disadvantages. 5
- (b) What do you mean by concurrent operations ? List two disadvantages of it. Discuss the solutions for the problem occur due to concurrency. 5
6. (a) What is query optimization ? Write the Heuristic optimization algorithm and solve the query given below : 5

Find the names of employees work on project name "XYZ" and born after 1965.

Project (Project\_name, Project#, Dept)

Employee (Emp\_id, Project#, DOB, Name)

Works\_on (Project#, Emp\_id)

- (b) What is query equivalence ? List six query equivalence rules. Explain different methods used for query evaluation plan. 5
7. (a) Explain deadlock with two phase locking with an example. Give two techniques to prevent deadlock. 5
- (b) Explain the ACID properties associated with Database Transactions. What is lost update problem ? 5
8. Write short notes on any two : 5×2
- (a) Data Fragmentation
  - (b) Exclusive Lock vs. Shared Lock
  - (c) Semi join