

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

Subject Code: 2620003**Date: 01-06-2015****Subject Name: Database Management System (DBMS)****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)** Mark True or False with justification. 7
- i. Normalisation removes dependency.
 - ii. ERD is used to show flow of data.
 - iii. The system is said to be RDBMS if it follows Dr.Codd rules.
 - iv. ACID property is must for concurrency of database.
 - v. Composition rule of Armstrong is $A \rightarrow B$ and $A \rightarrow C$ then $A \rightarrow BC$
 - vi. Shared lock is for read only.
 - vii. Instance is an overall structure of the database.
- (b)** Do as directed: 7
- i. List various components of DBMS and discuss each.
 - ii. Give benefits of Database system over File system.
- Q.2 (a)** Attempt the following 7
- i. Show that $\alpha \rightarrow \beta$ and $\alpha \rightarrow \gamma$ then $\alpha \rightarrow \beta\gamma$ [using Armstrong rules]
 - ii. Differentiate between Physical Data independence and Logical Data Independence
 - iii. Discuss Data abstraction in brief
- (b)** A Bank has many branches and a large number of customers. A 7
customer can open different kinds of accounts with bank. The bank keeps track of customer with social security number (SSN), name, address, phone number and age. Age is used as a factor to check whether he is major. There are different types of loans each identify by a loan number. Customer can take more than one type of loan. Loans have a duration and interest rate. The account holder can enquire about balance in this account. Draw ERD and show cardinality and convert into the relations.
- OR**
- (b)** Explain the concept of Generalisation or Specialisation giving 7
example.
- Q.3 (a)** Write each rule of 2NF and 3NF and explain each with example. 7

- (b) Explain giving example the concept of Functional Dependency, Fully Functional Dependency and Trival Dependency. 7

OR

- Q.3** (a) Why Normalisation is required? Explain the concept of Closure of Functional Dependency with example. 7
(b) Explain the concept of Multivalued Dependency and 4NF. 7

- Q.4** (a) BOOK_MAST(book_code, book_name, isbn_no, tot_books, publisher, edition) 7
ISSUE_RECEIPT(book_code, trans_type, trans_date)
AUTHOR(book_code, author_name)
Note : Transaction type can be -I∅ for issue and -R∅ for return

Write Relational Algebra for the following:

1. Display list of books which are issued for more than 14 days.
2. Display list of all books with its edition wise details published by -Oxford∅publisher.
3. Gives publisher name for whom a author has written more than 3 books.
4. Display total number of books for the author named -C.J.Date∅
5. Display name of books which are not issued.
6. Display total books which is return today.
7. Display author name who has publish same book for more than one edition.

- (b) Why checkpoint is necessary? Discuss its concept in detail showing example. 7

OR

- Q.4** (a) Discuss ACID properties giving example. 7

- Q.4** (b) Explain the concept of Natural Join, Cartesian product, and Assignment operator of Relational Algebra giving example. 7

- Q.5** (a) Explain the concept of serializability giving example. 7
(b) Discuss Timestamp ordering protocol. 7

OR

- Q.5** (a) What is deadlock ? What are different types of locks ? Explain the conditions for occurrence of deadlock and explain in brief Deadlock detection technique. 7
(b) Define log. Give uses of log. Compare deferred and Immediate version of log based recovery schema in terms of easy implementation and overhead cost. 7
