Register No. ☐☐☐☐☐☐☐☐

BE Degree Examination April 2016

Fourth Semester

Computer Science and Engineering

14CST41 – DATABASE MANAGEMENT SYSTEMS

(Regulations 2014)

Common to BTech Information Technology

Time: Three hours   Maximum: 100 marks

Answer all Questions

Part – A (10 × 2 = 20 marks)

1. Identify any two responsibilities of a database management system. For each responsibility, analyze the problems that would arise if the responsibility were not discharged.

2. Let the following relation schemas be given: $R = (A,B,C)$ $S = (D,E,F)$. Let relations r(R) and s(S) be given. Give an expression in SQL that is equivalent to $\Pi A(r)$.

3. How will you handle binary M:N relationship of ER model in relational model?

4. Reason out whether it is mandatory to break all ternary relationship to binary relationships.

5. Consider $F = \{C-> A, GB-> CH, H-> ED, A-> g, E-> B\}$. Prove that F implies HA->GD using only the definition of a the functional dependency.

6. If multi-valued dependencies are not removed, what anomalies will be posed? Justify with an example.

7. What is the purpose of bit map index?

8. Differentiate sparse and dense index.

9. Give an example for non recoverable schedule.

10. What are the states of a transaction?

Part – B (5 × 13 = 65 marks)

11. a. i) Explain the components of a DBMS with a neat diagram.   (7)

    ii) Discuss the set operators in relational algebra.   (6)

(OR)

    b. Elucidate the pros and cons of file and database approaches.   (13)

12. a. i) Illustrate various types of join operations in SQL.   (7)

    ii) Compare 1) strong and weak entity 2) composite and multi valued   (6)
       attributes 3) overlapping and disjoint constraints.

(OR)

b. Consider an online auction database system in which members (buyers and sellers) participate in the sale of items. The data requirements for this system are summarized as follows: (13)

* The online site has members who are identified by a unique member id and are described by an email address, their name, a password, their home address, and a phone number. A member may be a buyer has a shipping address recorded in the database. A seller has a bank account number and routing number recorded in the database.

* Items are placed by a seller for sale end are identified by a unique item number assigned by the system. Items are also described by an item title, an item description, a starting bid price, bidding increment, the start date of the auction, and the end date of the auction. Buyers make bids for items they are interested in. a bidding price and time of bid placement is recorded. The person at the end of the auction with the highest bid price is declared the winner and a transaction between the buyer and the seller may proceed soon after.

* Buyers and sellers may place feedback ratings on the purchase or sale of an item. The feedback contains a rating between 1 and 10 and a comment. Note that the ratings (feedback) are placed on a completed transaction by the buyer or seller of the item in the transaction.

Design an entity relationship diagram for the auction database and transform the same to relational model.

13. a. Show the process of normalization with an example and explain the different types of functional dependencies. State reasons for removing them. (13)

(OR)

b. i) Give a set of FDs for the relation schema R(A,B,C,D) with primary key AB under which R is in INF but not in 2NF. (7)

ii) Identify one insert, delete and update anomaly from patient dental appointment relation given below. (6)

Staff no	Dentist name	Patient no	Patient name	Appointment		Surgery no
				Date	Time	
S1011	Tony smith	P100	Gillian white	12 Aug 03	10.00	S10
S1011	Tony smith	P105	Jill Bell	13 Aug 03	12.00	S15
S1024	Helen pearson	P108	Ian MacKay	12Sept 03	10.00	S10
S1024	Helen pearson	P108	Ian MacKay	14Sept 03	10.00	S10
S1032	Robin Pievin	P105	Jill Bell	14 Oct 03	16.30	S15
S1032	Robin Plevin	P110	John Walker	15 Oct 03	18.00	S13

14. a. Enumerate with example, transformation of relational expressions. (13)

(OR)

b. i) Explain the stages of query processing. (7)

ii) Compare static and dynamic hashing. (6)

15. a. Explain the possible problems that occur due to concurrency in transactions. (13) Discuss various techniques for controlling concurrency.

(OR)

b. Discuss the following

i) Failure classification (7)

ii) Buffer management (6)

Part – C (1 × 15 = 15 marks)

16. a. Consider the following database schema with appropriate data types and (15) necessary constraints.

Parts (part id, nam, color, piece_weight, price)

Orders (order id, customer, shipping_addr, orderdate, shipping_date)

Parts_order(order id, parts id, quantity, parts_price)

Write the SQL queries for the following

i) What is the total price of each order?

ii) List the name of all parts whose last letter is 'd' and are red in color.

iii) How many days does it take to ship the orders?

iv) Give the details of all the parts whose price is less than Rs.150 and their color is neither red nor blue.

(OR)

b. Explain the possible ways of organizing records in files. Give examples. (15)