

# MANIPAL INSTITUTE OF TECHNOLOGY

A Constituent unit of MAHE. Manipal

### IV SEMESTER B.TECH. (COMPUTER SCIENCE & ENGINEERING)

#### **MAKE-UP EXAMINATIONS, JUNE 2018**

#### SUBJECT: DATABASE SYSTEMS[CSE 2204]

## REVISED CREDIT SYSTEM (23/06/2018)

Time: 3 Hours

MAX. MARKS: 50

#### **Instructions to Candidates:**

- ✤ Answer ALL the questions.
- ✤ Missing data may be suitable assumed.

1A.	Explain the following parts of database language. i) Data Manipulation language ii) Data definition language	4M
1B.	<ul> <li>Consider the following relational schema for a library: member(memb no, name, dob) books(isbn, title, authors, publisher) borrowed(memb no, isbn, date)</li> <li>i) For each publisher, find the name and membership number of members who have borrowed more than five books of that publisher.</li> <li>ii) Find all the borrower details who borrowed the books of authors who published two or more books.</li> </ul>	4M
1 <b>C</b> .	With an example explain the division operation in relation algebra.	2M
2A.	Consider the Bank database shown below where primary keys are underlined. branch( <u>branch_name</u> , branch_city, assets) account(account_no, brach_name, balance) depositor(customer_name, account_no) borrower(customer_name,loan_no) Construct the following SQL queries for the following. i) Find the customer who have both an account and a loan at the bank. ii) Find the number of depositors for each branch. iii) Pay 5 percent interest on accounts whose balance is greater than average balance of all the accounts.	5M
2B.	Discuss the different ways in which a join operation can be modelled using SQL	3M
2C.	What are nested queries? Illustrate your answer with an example.	2M

**3A.** Construct an E-R diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Each insurance policy covers one or more cars, and has one or more 3M premium payments associated with it. Each payment is for a particular period of time, and has an associated due date, and the date when the payment was received. **3B.** Explain a representation for each of the following; 3M i) A record with variable-length attributes ii) A block with variable-length records 3C. Suppose that we are using extendable hashing on a file that contains records with the following search-key values: 10, 11, 13, 15, 19, 25, 27, 31, 37, 39 Give the extendable hash structure for this file if the hash function is  $h(x) = x \mod 8$ and buckets can hold three records. Also, show how the extendable hash structure **4M** changes as the result of each of the following steps: a. Delete 19. b. Delete 39. c. Insert 9. d. Insert 23 **4A.** Give an algorithm for testing dependency preservation. What are the two alternative 3M methods which avoid the computation of  $F^+$ ? Explain. Suppose you are given a relation R with four attributes ABCD. For each of the 4B. following sets of FDs, assuming those are the only dependencies that hold for R, do the following: (a) Identify the candidate key(s) for R. (b) Identify the best normal form(3NF or BCNF) that R satisfies. (c) If R is not in BCNF, decompose it into a set **4M** of BCNF relations that preserve the dependencies, if any.  $C \rightarrow D, C \rightarrow A, B \rightarrow C$ i.  $B \rightarrow C, D \rightarrow A$ ii.  $ABC \rightarrow D, D \rightarrow A$ iii. **4C.** Given a relation R = (A, B, C, G, H, I) with multivalued dependencies 3M  $F = \{ A \rightarrow B; B \rightarrow HI; CG \rightarrow H \}$ Test whether R is in 4NF? If not, decompose R into a set of 4NF relations. Explain secondary index mechanism with an example 5A. 3M 5B. What is a conflict serializable schedule? How a precedence graph is used for 3M determining conflict serializability of a schedule? Illustrate with an example. 5C. What is a log? What are the different types of log records? How the log is used to **4M** 

redo and undo transactions? Explain