Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institute of MAHE, Manipal

IV SEMESTER B.TECH. (INFORMATION TECHNOLOGY) END SEMESTER EXAMINATIONS, APRIL 2018

SUBJECT: DATABASE SYSTEMS [ICT 2203]

REVISED CREDIT SYSTEM
(25/04/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer ALL the questions.
- Missing data may be suitably assumed.

1A. Consider the following relations.
Employee(Emp_Id, Name, City, Company_Id, Salary, Mgr_Id)
Company(Company_Id, Name, City)
Where Mgr_Id refers Emp_Id of Employee table. Write the SQL query for the following.

i. Find all employees who earn more than the average salary of all employees of their company.
ii. Find the companies that have the most employees.
iii. Find all employees in the database who live in the same city as do their Manager. 5

1B. Consider the following three schedules of transactions T1, T2 and T3. [Notation: In the following NYO represents the action Y (R for read, W for write) performed by transaction N on data O.]
(S1) 2RA 2WA 3RC 2WB 3WA 3WC 1RA 1RB 1WA 1WB
(S2) 3RC 2RA 2WA 2WB 3WA 1RA 1RB 1WA 1WB 3WC
(S3) 2RA 3RC 3WA 2WA 2WB 3WC 1RA 1RB 1WA 1WB
Check whether the given schedule is conflict serializable or not. 3

1C. For the database scheme given in Q1A find all companies located in every city in which Small Bank Corp. is located. (Assume that the companies may be located in several cities). 2

2A. Consider the following relations.
Request (accno, type, amount);
Account (accno, balance);
Write a trigger which will be executed when a tuple is inserted into a Request relation. Here type attribute in the Request relation is either "deposit" or "withdraw". Write a trigger which performs the following:

i. Displays the request details.
ii. When the transaction is deposit, then update the Account relation.
iii. If the transaction is withdrawal, perform the operation only if there is a sufficient balance (balance >=1000).
iv. If there is no sufficient balance display the message "INSUFFICIENT BALANCE" 5

2B. Let R (A, B, C, D) be a relation. Which of the following does not have a lossless join, dependency preserving BCNF decomposition? State the reason.
   i. R1(A,B,C), R2(C,D) , AB→C, C→AD
   ii. R1(A,B), R2(B,C), R3(C,D), A→B, B→C, C→D
   3

2C. How roles can be granted a privilege? Explain with suitable syntax. 2

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 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. Also convert the ER diagram into schema diagram. 5

3B. Explain wound-wait scheme along with example. Is it preemptive technique? Give reason. 3

3C. What is the problem of Cascading schedule? Explain with example how it could be rectified. 2

4A. Write an algorithm to compute closure of attribute sets. Also for a given relation R (A, B, C, D, E, F, G, H) with functional dependencies F={ A → B, ABCD → E, EF → G, EF → H, ACDF → E, ACDF → G }, find its canonical cover. 5

4B. Discuss all the phases involved in recovery process which takes place during the execution of the transaction and after the failure of a transaction. 3

4C. Decompose the following relation R to keep it in a highest normal form.
R (CarReg, Hiredate, Make, Model, cutsno, Custnam, outletno, outletloc)
Following are the functional dependency set.
F={ CarReg, Hiredate → Custno, CustNo →CustName, model → Make ,
outletNo →outletloc, carreg →Model, Outletno}
2

5A. Write an algorithm for BCNF decomposition. Let R (A, B, C, D) be a relation and F = {A→B, B→C, C→D} be a set of functional dependencies. Check whether the relation is in BCNF or not. If not, decompose the relation into BCNF compatible relations. 5

5B. Brief about the significance of following database concepts along with example:
   i. Metadata
   ii. Program-data independence
   iii. Data abstraction
   3

5C. Mention the conditions to be satisfied, if a view is said to be updatable. 2