Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Unit of MAHE, Manipal

FOURTH SEMESTER B.TECH. (INFORMATION TECHNOLOGY)

END SEMESTER EXAMINATIONS, APRIL-MAY 2019

SUBJECT: DATABASE SYSTEMS [ICT 2203]

(REVISED CREDIT SYSTEM)
(02/05/2019)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates:
- Answer ALL questions.
- Missing data, if any, may be suitably assumed.

1A. Illustrate the problems associated with the bad relational design with suitable examples and describe in detail how to eliminate those problems. **5**

1B. Consider the schema given in Fig. Q.1B:

CUSTOMER(cust#: int, cname:string, city:string)
ORDERS(order#:int, odate:date, cust#:int, ordamt: int)
ORDER_ITEM(order#:int, item#: int, qty: int)
ITEM(item#: int, unitprice: int)
SHIPMENT(order#: int, warehouse#: int, shipdate: date)
WAREHOUSE(warehouse#: int, shipdate: date)

Fig. Q.1B

Write a SQL query to print the order information (along with its customer information), which has at least two items each with quantity > 50. **3**

1C. What are the responsibilities of database administrator? **2**

2A. Consider a system which stores the information about the books. Each book maintained under this system has an ISBN, title, price and year information. The book is published by particular publisher. The system stores URL, phone, address and name of the publisher. System also stores information about the author such as name, address and url. Author can write any number of books. System maintains customer information along with book information they have purchased. Customer information like email-id, name, address and phone are stored. System has few warehouses to stock books. Warehouse has information like code, address, and phone. Each warehouse can store few copies of the book.

Draw an ER-Diagram describing the above scenario. Reduce the diagram and mention in which normal form the database is. **5**

2B. With a suitable example illustrate the inconsistency problems resulting due to the uncontrolled execution of the concurrent transaction. **3**

2C. Write an algorithm to find the canonical cover for a given functional dependency set. **2**

3A. Differentiate between conflict serializable and view serializable schedules. Using graph technique check whether given schedule is conflict serializable. If it is conflict serializable then find the transaction execution order using graph technique. Schedule is: R1(X); R2(Y); R3(Y); T2(Y); W1(X); W3(X); R2(X); W2(X); **5**

3B. Discuss the pitfalls of Lock-based protocols with suitable example along with the counter measure for the same. **3**

3C. How are views different from tables? What are Materialized views? **2**

4A. Consider the schema given in Fig. Q.4A.

CAR(Serial_No, Model, Manufacturer, Price)
OPTIONS(Serial_No, Option_Name, Price)
SALES(Salesperson_id, Serial_No, Date, Sale_price)
SALESPERSON(Salesperson_id, Name, Phone)

Fig. Q.4A

Write SQL query to do the following

a. For the salesperson named 'Richard Castle', list the following information for all the cars he sold: Serial_No, Manufacturer, Sale_price.

b. List the Serial_No and Model of cars that have no options. (Use nested subquery)

c. Display the information of salesperson with maximum number of sales. Use **with** clause to get number of sales of each salesperson.

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4B. Discuss various deadlock prevention methods in concurrency control. **3**

4C. Find the candidate keys for the relation R(A, B, C, G, H, I) with the set of functional dependencies, F={A→B; A→C; CG→H; CG→I; B→H} **2**

5A. For the schema given in Fig. Q.5A write the following

Employee(Empid, Ename, Deptid, Salary, Hiredate, Jobid)
Department(Deptid, Deptname, Location)

Fig. Q.5A

i. Write a procedure to display employee names and department id's in which they are working who are hired on a specified date, if that department has more than 2 locations.

ii. Write a trigger to satisfy the condition in employee table that the new salary of the employee should be always greater than old salary

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5B. Relation R(A, B, C, D, E, F) has following functional dependencies, F = {A→CD, A→EF, BC→AD, BC→E, BC→F, B→F, D→E} with following decomposed tables, R1(A, B, C, D), R2(B, F) and R3(D, E). Check whether the decomposition is dependency preserving or not. **3**

5C. Explain the various transaction states with a neat state diagram. **2**