Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

V SEMESTER B.TECH. (COMPUTER AND COMMUNICATION ENGINEERING)

MAKEUP EXAMINATIONS, JAN. 2017

SUBJECT: DATABASE SYSTEMS [ICT 3154]

REVISED CREDIT SYSTEM
(03/01/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data if any, may be suitably assumed.

1A. Consider the following database schema.
Cutomer (Id, Name, City, Country, Phone)
Order (Id, OrderDate, OrderNumber, CustomerId, TotalAmount)
Product (Id, ProductName, SupplierId, UnitPrice, Package)
Supplier (Id, CompanyName, ContactName, City, Country, Phone, Fax)

Write the SQL query for the following:
i. Find suppliers with products over $100.
ii. List the total amount ordered for each customer in a descending order. **5**

1B. Explain the working of validation based concurrency control protocol. **3**

1C. Differentiate between a serial schedule and serializable schedule with respect to transaction. **2**

2A. Answer the following:
i. What are the different types of Data Models? Explain.
ii. What is data abstraction in database? Explain different levels of data abstraction. **5**

2B. Create a procedure which displays the number of students in each grade and total number of students who has taken the prerequisite for a given course. Consider the following database schema.
Student(S_Id, Name, Tot_credit)
Takes(S_Id, C_Id, Grade, Sem)
Course(C_Id, Title, Credits)
Prereq(C_Id, Pre_Id)
Pre_Id refers to C_Id of the Course table. **3**

2C. Consider the following database schema
Order (Order_Id, OrderDate, OrderNumber, CustomerId, TotalAmount)
Customer (Id, Name, City, Country, Phone)
Write a SQL query to list the customers those who have not placed orders **2**

3A. Answer the following:

i. Consider the following database schema and create an assertion to check the number of accounts for each customer in a given branch is at most two.
Account(Account_no, Branch_Name, Balance)
Deposite(Customer_Name, Account_no)

ii. Describe Permission Statements in SQL. **5**

3B. A Relation R(A,B,C,D,E,F,G,H,I,J) has the following set of FDs
{ AB→C , B→DE, B→F, F→GH, D→IJ}
Answer the following questions with respect to the above mentioned FDs.

i. Find out the candidate keys for R.
ii. Normalize the above relation till BCNF. **3**

3C. Match customers who are from the same city and country using the following Customer schema.
Customer (Id, Name, City, Country, Phone) **2**

4A. A Relation R(A,B,C,D,E) has the following set of FDs
A→ BC, B→ E, C→ D, A→ E, D→ B
Is the decomposition of this relation to R1(A,B,C), R2(C,D), R3(B,D,E) lossless or dependency preserving? Justify your answer. **5**

4B. What is recursive relation in an ER diagram? Reduce a relationship set 'Guide' between Teacher and Student entities by considering 1:1, 1:M, M:M cardinality. **3**

4C. Prove or disprove the following statements using inference rules.
{X→Y,Y→Z,XY→Y}={XY→YZ}
{ X→Y, XY→Z}={X→Z} **2**

5A. Company organized into DEPARTMENT. Each department has unique name and a particular employee who manages the department. Start date for the manager is recorded. Department may have several locations. A department controls a number of PROJECT. Projects have a unique name, number and a single location. Company's employee name, ssno, address, salary, sex and birth date are recorded. An employee is assigned to one department, but may work for several projects (not necessarily controlled by her dept). Number of hours/week an employee works on each project is recorded; The immediate supervisor for the employee. Employee's DEPENDENT are tracked for health insurance purposes (dependent name, birthdate, relationship to employee).
Draw an ER diagram for the above scenario. Make sure to indicate the various attributes of each entity type, cardinality constraints and relationship set along with the key for each entity type. **5**

5B. What is ACID properties? Draw a state diagram to discuss the typical states that a transaction goes through during its life time. **3**

5C. Check whether the following functional dependency sets are equivalent.
F: A→ B, AB→ C,D→ AC,D→ E G: A→ BC,D→ AE **2**