Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

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

END SEMESTER EXAMINATIONS, NOVEMBER 2017

SUBJECT: DATABASE SYSTEMS [ICT 3154]

REVISED CREDIT SYSTEM
(22/11/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A. i. Create a procedure to perform the following task using cursor concept. The following relational schema has to be considered. **5**
Instructor (Instructor_Id, Name, Dept_No)
Taught (Course_No, Instructor_Id, No_of_Students)
Course (Course_No, Course_Name, Dept_No)
Attendance (Student_Id, Course_No, Attendence_Percentage)
Employee (Emp_Id, Emp_Name, Salary, Mgr_Id, Dept_No) [Mgr_Id refers Emp_Id]
Categorize and store the instructors separately, where one category has instructors who teach at most one course and another category of instructors who handles at least two courses other than his/her department. Display instructors of the two categories separately.

ii. Display top three highest-paid employees. Consider above Relational schema.

1B. Explain the recovery algorithm phases performed during recovery from failures. Consider the following log file content at two instances of time, mention the recovery actions in each case along with the data item value. **3**

<T0 Start>	<T0 Start>
<T0, A, 1000, 950>	<T0, A, 1000, 950>
<T0, B, 2000, 2050>	<T0, B, 2000, 2050>
<T0 Commit>	<T0 Commit>
<T1 Start>	<T1 Start>
<T1, C, 700, 600>	<T1, C, 700, 600>
	<T1 Commit>

1C. List out and explain all the uses of attribute closure. **2**

2A. Design an ER schema for keeping track of information about votes taken in the U.S. House of Representatives during the current two-year congressional session. The database needs to keep track of each U.S. STATE's Name (e.g., Texas, New York, California) and includes the **5**

Region of the state (whose domain is {Northeast, Midwest, Southeast, Southwest, West}). Each CONGRESSPERSON in the House of Representatives is described by their Name and includes the district represented, the StartDate when they were first elected, and the political party they belong to (whose domain is {Republican, Democrat, Independent, Other}). The database keeps track of each BILL (i.e., proposed law), and includes the BillName, the DateOfVote on the bill, whether the bill passed or failed (whose domain is {YES, NO}) and the Sponsor (the congressperson(s) who sponsored—i.e., proposed—the bill). The database keeps track of how each congressperson voted on each bill (domain of vote attribute is {Yes, No, Abstain, Absent}). Draw an ER schema diagram for the above application. State clearly any assumptions you make. Further, reduce the ER diagram to a Schema Diagram.

2B. For a Functional Dependency set F = {A → BC, B → C, A → B, AB → C}, find canonical cover. **3**

2C. Write a command which imposes the following constraint on the Library database system. Each student can have a maximum of 5 books, where a Book issued to a student is stored in a table, Issue (Student_Id, Book_Id). **2**

3A. i. Given R = (A, B, C, D, E) and F = {A -> B, BC -> D}, find candidate keys and check in which normal form the R is? (State the reasons). **5**

ii. Check whether the following decomposition preserves dependency or not with regard to above F?
R1 = (A, B), R2 = (A, C, D) and R3 = (A, C, E) (Show all the steps).

3B. Identify the type of serializability supported by the schedule S1. Clearly, show all the steps of performing both the serialization. Use the topological sorting technique to determine serializability order if any. S1: R2(X), W3(X), W1(x), W2(Y), R2 (Z), R4(X), R4(Y). **3**

3C. Create a function to return the total number of students for a given department. Consider Schema given in Q.No. 1A. **2**

4A. i. Write an ER model for the following requirements of a company. **5**
Each department can have anywhere between 1 and 10 employees. Each phone is used by one, and only one, department. Each phone is assigned to at least one and may be assigned to up to 10 employees. Each employee is assigned at least one, but no more than 6 phones.

ii. Explain aggregation along with suitable example and representation.

4B. Find instructors who teach more than two courses, where each course with less than sixty students. Refer Schema given in Q.No. 1A. **3**

4C. Explain all forms of authorization to modify the database schema. **2**

5A. i. What are the significances of W-Timestamp (Q) and R-Timestamp (Q) concepts in Timestamp-Based Protocol? Explain with a suitable example. **5**

ii. Get the list of students who have taken at most two courses each offered by 'CSE' and 'ICT' departments, without using 'Having' clause.

5B. Explain 'Thomas write' rule with a suitable example and also mention its pros and cons. **3**

5C. State the differences between Database Actors and Workers with a suitable example. **2**