Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

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

MAKEUP EXAMINATIONS, JANUARY 2017

SUBJECT: SOFTWARE DESIGN TECHNOLOGY [ICT 359]

REVISED CREDIT SYSTEM
(05/01/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data if any, may be suitably assumed.

1A. Draw the activity network representation for the project given in Table Q.1A and compute the following (Consider T12 as final task)

i) Identify the critical path and its duration for the given project.
ii) Identify slack time of task T2, T6 and T11.
iii) Identify early start time of Task T4
iv) Identify latest start time of Task T8

Table Q.1A

Task name	Duration(days)	Dependencies
T1	6	-
T2	15	T1
T3	12	-
T4	10	T2
T5	10	T1,T4
T6	5	T1,T2,T3
T7	13	T1
T8	25	T5, T6
T9	15	T3,T6,T7
T10	15	T7
T11	7	T9,T10
T12	14	T8,T10

5

1B. Explain Rapid Application Development model with suitable diagram. **3**

1C. Distinguish alpha testing and beta testing with two appropriate points. **2**

2A. Define the purpose of the following terms with suitable example and UML notations
i) Fork and Join
ii) Synchronous and Asynchronous Message
iii) Composition **5**

2B. Draw swim-lane diagram for the following scenario.
The purpose of the Open Access Insurance System is to provide automotive insurance to car owners. Initially, prospective customers fill out an insurance application, which provides information about the customer and his or her vehicles. This information is sent to an agent, who sends it to various insurance companies to get quotes for insurance. When the responses return, the agent then determines the best policy for the type and level of coverage desired and gives the customer a copy of the insurance policy proposal and quote. **3**

2C. List contents of Software Requirement Specifications. **2**

3A. Draw the state machine diagram for the following scenario.
An active process is normally in one of the five states in the diagram. A process is running if it is assigned to a CPU. A process is preempted that is, removed from the running state by the scheduler if a process with a higher priority becomes runnable. A process is also preempted if it consumes its entire time slice and a process of equal priority is runnable. A process is runnable in memory if it is in primary memory and ready to run, but is not assigned to a CPU. A process is sleeping in memory if it is in primary memory but is waiting for a specific event before it can continue execution. For example, a process is sleeping if it is waiting for an I/O operation to complete, for a locked resource to be unlocked, or for a timer to expire. When the event occurs, the process is sent a wake up; if the reason for its sleep is gone, the process becomes runnable. A process is runnable and swapped if it is not waiting for a specific event. A process is sleeping and swapped if it is both waiting for a specific event. When the system is short of primary memory, it writes individual pages of some processes to secondary memory but still leaves those processes runnable. **5**

3B. Explain any three known and predictable risk categories with suitable example. **3**

3C. Compute the function point for the following project characteristics.
Number of user inputs=5, with degree of complexity equal to simple (3)
Number of user output=10, with degree of complexity equal to average (5)
Number of user enquiries=5, with degree of complexity equal to complex (6)
Number of user files=8, with degree of complexity equal to simple (7)
Number of external interfaces=3, with degree of complexity equal to complex (10) and Adjustment factor = 2.03 **2**

4A. Draw the use case diagram for the following scenario.
This software is to be used by the manager of the news agency and his delivery persons. For each delivery person, the system must print each day the publications to be delivered to each address. The addresses should be generated in consecutive order as far as possible so that the commutation of the delivery person is minimal. Customers usually subscribe one or more newspapers and magazines. They are allowed to change their subscription list by giving one week's advance notice. For each delivery person, the system must print each day the publication to be delivered to each address. The system should also print for the news agent the information regarding who received what publications and summary information of the current month. At the beginning of every month bills are printed by the system to be delivered to the customers. These bills should be computed by the system automatically and should include the publication type, the number of copies delivered during the month, and the cost for these. The customers may ask for stopping the deliveries to them for certain periods when they go out of station. Customers may request to subscribe new newspapers/magazines, modify

their subscription list, or stop their subscription altogether. Customers usually pay their monthly dues either by cheques or cash. Once the cheque number or cash received is entered in the system, receipt for the customer should be printed. If any customer has any outstanding due for more than one month, a polite reminder message is printed for him and his subscription is discontinued if his dues remain outstanding for period of more than two months. The software should compute a print out the amount payable to each delivery boy. Each delivery boy gets 2.5% of the value of the publications delivered by him. **5**

4B. With a suitable diagram explain the following terms of sequence diagram for the scenario given in Q. 4A.
1. Synchronous Message
2. Asynchronous Message
3. Lost/Found Message **3**

4C. Explain the Client-Server architecture style with a suitable example. **2**

5A. Identify the classes with the noun phrase approach and draw the class diagram with all relationships and appropriate multiplicities for the following problem statement.
The Best School of Business keeps track of each graduate's student number, name, country of birth, current country of citizenship, current name, current address, and the name of each major the student completed (each student has one or two majors). To maintain strong ties to its alumni, the school holds various events around the world. Events have title, date, location, and type (e.g., reception, dinner or seminar).The school needs to keep track of which graduates have attended which events. When a graduate attends an event, a comment is recorded about the information school officials learned from that graduate at that event. The school also keeps in contact with graduates by mail, e-mail, telephone and fax interactions. As with events, the school records information learned from the graduate from each of these contacts. When a school official knows that they will be meeting or talking to a graduate, a report is produced showing the latest information about that graduate and the information learned during the past two years from that graduate from all contacts and events the graduate attended. **5**

5B. How is analysis modelling mapped to design modelling? Explain with a suitable diagram. **3**

5C. Define driver and stubs. Explain their usage in unit testing. **2**

6A. Draw Control Flow Graph for the code snippet below. Calculate cyclomatic complexity by using regions, edges and predicate nodes and also identify independent paths for the CFG drawn.

```
int BinSearch (char *item, char *table[], int n){
   int bot = 0;   int top = n - 1;
   int mid, cmp;
   while (bot <= top) {
     mid = (bot + top) / 2;
     if (table[mid] == item)            return mid;
     else if (compare(table[mid], item) < 0)
       top = mid - 1;
     else
       bot = mid + 1;}
   return -1; // not found }
```

5

6B Explain any two principles of Agile. **3**

6C Explain the types of requirements identified by the technique that translated the needs of the customer into technical requirements for software **2**