Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

IV SEMESTER B.TECH. (INFORMATION TECHNOLOGY)

MAKE UP EXAMINATIONS, JUNE 2019

SUBJECT: SOFTWARE ENGINEERING [ICT 2204]

REVISED CREDIT SYSTEM
(19/06/2019)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A. Consider the following system: **5**

In a Minimart, Point of Sell (POS) system is used at the front desk in order to manage sales transactions. We have one cashier using the system to print receipt for customers when they buy products. From this system, we can produce sales reports effectively and efficiently. This system will communicate with Inventory control system in order to get stock quantity and update stock balance automatically. The system admin have control over the price which is sold to the customer. The system admin can set up different types of users based on the role. Higher the privilege more access to the system resources. The backup functionality of database is also done by the system admin. Authenticated customer on purchase of the product above $25 will get a discount of 5% on his total cost. The hackers on the other side can easily attack the password by dictionary attack if the password is not strong. Password starts with alphabet followed by one or more numbers, followed by zero or more special characters are said to be strong password. If the customer is not authenticated the discount will be given only on the special occasions. Further in a Minimart the customer can search and download various articles from IEEE website. Article can be either book or journal. Article will be reviewed by the editor board of IEEE before publishing. The Minimart should pay $100 as a yearly charge. At a time maximum of 5 users can access the IEEE site.

i) Draw the use case diagram for the scenario pertaining to POS in the Minimart.

ii) Write the use case specification for any one use cases of the use case diagram drawn in Q1.A.(i).

1B. Explain the types of requirements identified by the technique that translated the needs of the customer into technical requirements for software. **3**

1C. Explain any four principles of agility. **2**

2A. Identify the classes for the problem statement given in Q.1A and draw the detailed class diagram for the same. **5**

2B. Why is the spiral model a realistic approach to the development of large scale systems and software? **3**

2C. Briefly explain the specification task with reference to requirements engineering. **2**

3A. Draw the Activity diagram for the University Department Information System. The summary of the requirements is as follows. **5**

Various details regarding each student such as his name, address, course registered, etc. are entered at the time he/she takes admission. At the beginning of every semester, students register for courses. The information system should allow the department secretary to enter data regarding student registrations. When the secretary enters the roll number of each student, the computer system should bring up a form for the corresponding student and should keep track of courses he has already completed and the courses he has back-log, etc. At the end of the semester, the instructors leave their grading information at the office which the secretary enters into the computer. The information system should be able to compute the grade point average for each student for the semester and his cumulative grade point average (CGPA) and print the grade sheet for each student. The information system should also keep track of inventories of the Department, such as office equipment, furniture, etc. The information system should also keep track of the research projects running in the department and publications by the faculty.

3B. Draw the State diagram for the following problem statement. **3**

Librarians categorize the library books into loanable and non-loanable books. The non-loanable books are the reference books. However, the loanable books are the non-reference books. After cataloguing the books, the books are available for loan. Students who borrow the library books should return them back before the due date. Books that are 12 months over the due date would be considered as a lost state. However, if those books are found in the future, they must be returned back to the library. When the books are found which are not required in the library or have been damaged, the book would be disposed.

3C. Which life cycle model will you follow for developing an extremely large software that would provide, monitor and control cellular communication among its subscribers using a set of revolving satellites? Justify your answer. **2**

4A. With a neat diagram explain different types of integration testing with respect to conventional software architecture. **5**

4B. Compute the function point for the following project characteristics. **3**

Number of user inputs=5, with degree of complexity equal to simple with value 3
Number of user output=10, with degree of complexity equal to average with value 5
Number of user enquiries=5, with degree of complexity equal to complex with value 6
Number of user files=8, with degree of complexity equal to simple with value 7
Number of external interfaces=3, with degree of complexity equal to complex with value 10 and Adjustment factor = 1.07

4C. How does an activity network help in project scheduling? What is a critical path with reference to an activity network? **2**

5A. Consider the pseudo code in the Fig.Q.5A and perform the following. **5**

i) Draw the CFG for the pseudo-code.
ii) Find the Cyclomatic complexity for the CFG in terms of regions, edges and predicate nodes.
iii) Find the independent execution paths.
iv) Write the test cases for the identified independent paths.

```
int i=0, temp=0, n=5;
while(i<n-1) {
  j=i+1;
  while(j<n) {
    if(a[i]<a[j]) {
       temp=a[i];
       a[i]=a[j];
       a[j]=temp;
     }
   }
    i=i+1;
}
```

Fig.Q.5A

5B. With suitable examples explain any three different types of system testing with respect to Object oriented architecture. **3**

5C. Explain the difference between equivalence class partitioning and boundary value analysis with suitable examples. **2**