Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institute of Manipal University

FOURTH SEMESTER B.TECH. (INFORMATION TECHNOLOGY)

END SEMESTER EXAMINATION, APR/MAY 2017

SUBJECT: SOFTWARE ENGINEERING [ICT-2204]

(REVISED CREDIT SYSTEM)
(28/04/2017)

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

Instructions to candidates:

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

1A. Consider the code snippet given below:

```
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;
}
```

(a.) Draw the CFG for the code snippet.
(b.) Calculate the cyclomatic complexity.
(c.) Identify the independent paths.
(d.) Identify the test cases for basis path testing. **(05)**

1B. Explain the difference between equivalence class partitioning and boundary value analysis with suitable examples. **(03)**

1C. 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 **(02)**

2A. What is an agile process? Explain XP and Scrum agile process models in detail with a neat diagram. **(05)**

2B. Consider a project with following parameters:

(i) **External inputs:** 10 with low complexity, 15 with average complexity and 17 with high complexity

(ii) **External outputs:** 6 with low complexity and 13 with high complexity

(iii) **External inquiries:** 3 with low complexity, 4 with average complexity and 2 with high complexity

(iv) **Internal logical files:** 2 with average complexity and 1 with high complexity

(v) **External interface files:** 9 with low complexity.

In addition to above, system requires:

i. Significant data communication
ii. Performance is very critical
iii. Designed code may be moderately reusable
iv. System is not designed for multiple installation in different organizations.

Other complexity factors are treated as average. Compute the function points for the project.

Type	Simple	Average	High
External inputs	3	4	6
External outputs	4	5	7
External inquiries	3	4	6
Internal logical files	7	10	15
External interface files	5	7	10

(03)

2C. Explain the following with respect to class diagram with suitable example:
i.) Rolename ii) Self association. (02)

3A. A customer contacts the company for event management. He provides the details of the event and its requirements. He explains its aims, when and where the event will take place., how long it will last, its format (Presentation/Workshop and/or exhibition etc.,) expected number of delegates/guests, equipment and furniture required, whether any delegate pack or promotional material is to be distributed, and other facilities required. The event manager studies the requirements of the event carefully and using the event management system finds the estimated cost and informs the customer about it. The customer may check whether the cost suits the financial provisions of the event. The company can also offer some readymade packages to choose from. If the customer agrees, the event is booked and the advance deposit is taken by the company. According to the requirements of the event, different bookings are made. A strategic schedule is prepared for smooth conduct of the event. The event management system helps the manager in different tasks of planning, scheduling and conducting the event. This system provides instant access to event-related information. Thus resources are efficiently and economically utilized. Once the event is conducted successfully, the bills are generated by the system. The system is extensible. New functionalities can be added to the system, whenever it is needed due to changing requirements.
Draw the following UML diagrams for the scenario given above:
(i) Use Case diagram (ii) Class diagram (05)

3B. Explain the testing strategies with respect to object oriented software (03)

3C. Explain the Quality Function Deployment with reference to requirements engineering. (02)

4A. Consider an inventory system which is a real time application used in the merchant's day to day system. This is a database to store the transaction that takes places between the manufacturer, dealer and the shop keeper that includes stock inward and stock outward with reference to the dealer. Assume our self as the dealer and proceed with the transaction as follows: The manufacturer is the producer of the items and it contains the necessary information of the item such as price per item, date of manufacture, best before use, number of item available and their company address. The dealer is the secondary source of an item and he purchases Item from the manufacturer by requesting the required item with its corresponding company name and the number of items required. The dealer is only responsible for distribution of the item to the retailers in the town or city. The shop keeper or retailer is the one who is prime source for selling items in the market. The customers get item from the shop keeper and not directly from the manufacturer or the dealer. The stock is the database used in our system which records all transactions that takes place between the manufacturer and the dealer and the dealer and the retailer.
Draw the sequence and activity diagram for the above given problem statement. (05)

4B. Analyze the problem statement below and create a data flow diagram for the software requested. List any assumptions made during the analysis.
An automated system is needed to assist medical staff in monitoring the blood pressure for a patient in a medical care facility. The hardware will consist of a blood pressure cuff, control unit, display, audible alarm, and so on. The software in the control unit will control the hardware. The medical staff should be able to enter the upper and lower limits of the safe range for blood pressure for a patient. The blood pressure monitor will take readings every ten seconds and show the results as a graphic image that appears like a blood pressure gauge on the display. If the blood pressure reading is outside the safe range an audible alarm should be sounded until reset by the staff person. There should actually be two alarms; one for out of range "high" and one for out of range "low." (03)

4C. Define the following with reference to software design:
(i.) Abstraction (ii.) Control hierarchy (02)

5A. Consider a Digital Content Management System (DCMS). This system will provide a platform for storing/managing/viewing/sharing of their personal digital photographs/portfolios. Before using the functionality of the software, users will have to register on the system. The registered users can upload/delete photographs into/from their account and view other registered user's shared photographs. They can also mail the links of the photographs via email. Visitors or unregistered uers cannot upload any photographs but they can view all registered user's shared photographs on the site. The system will facilitate the administrator to remove users/photographs from the system if they are found disobeying the rules/norms of the system. Each user is defined using a specific user_id. A unique ideintification number is also maintained for the administrators.
Draw the state diagram for
(i.) Administrator (ii.) Photograph (05)

5B. Describe the two qualitative criteria for functional independence assessment with reference to software design. (03)

5C. Briefly explain the different tasks involved in initiating the requirements engineering process. (02)