



Time: 3 Hours

MAX. MARKS: 50

#### Instructions to Candidates:

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

- 1A. Draw the Swim-lane 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, publications by the faculties etc.
- 1B. Explain the types of requirements identified by the technique that translated the needs of the customer into technical requirements for software 3
- 1C. The module month which take the input integer between 1 to 12. Determine the boundary value analysis test cases. 2
- 2A. Consider the following system: 5
- In a Minimart, Point of Sell (POS) system is used at the front desk in order to manage sale transactions. We have one cashier using the system to print receipt for customers when they buy products. From this system, we can produce sale 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 Q.2A.(i)

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

2C. Explain any four principles of agility. 2

3A. Identify the classes for the problem statement given in Q.2A and draw the detailed class diagram for the same. 5

3B. With suitable example explain association class in class based modelling 3

3C. Consider the following myth and justify your answer. A general statement of objectives is sufficient to begin writing programs we can fill in the details later. 2

4A. Draw the State diagram for the following problem statement.  
 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 not required in the library or have been damaged, the book would be disposed.

5

4B. Explain the principles of risk management in the development of the software 3

4C. Distinguish between verification and validation during software development with two appropriate points. 2

5A. Consider the pseudo code in the Figure Q.5A 5

```

1. i = 0;
2. n=4; //n- number of nodes present in the graph
3. while (i<n-1) do
4.     j = i + 1;
5.     while (j<n) do
6.         if A[i]<A[j] then
7.             swap(A[i], A[j]);
8.         end do;
9.     i=i+1;
10. end do;
  
```

Figure Q.5A

- 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.

5B. With a neat diagram explain different types of integration testing. 3

5C. Differentiate between smoke and regression testing. 2