

- (i) Complexity High : 1.15
- (ii) Reliability High : 1.15
- (iii) Experience Low : 1.13
- (iv) Programmer's Capability Low : 1.17.

- (b) What are the advantages of function points over the size metric of LOC ?
- (c) How does the change of project duration affect the overall project development effort and development cost?

**6 + 3 + 3 = 12**

7. (a) Draw the PERT diagram for the given set of tasks and dependencies. Also draw the Gantt Chart for the given task with showing critical path. Assume start time =0.

Subtask	Time to complete	Dependencies
1	8	-----
2	10	-----
3	8	1,2
4	9	1
5	5	2
6	3	3,4
7	2	4,5
8	4	6,7
9	3	5,6

- (b) Explain when you should use PERT charts and when you should use Gantt charts while you are performing the duties of a project manager.

**(2 + 3 + 4) + 3 = 12**

**Group – E**

- 8. (a) What does the association relationship among classes represent? Give example of the association relationship.
  - (b) How a UML Use Case Diagram different from a traditional flow chart?
  - (c) Write the difference between include and extend relationship used in UML diagram (with example).
- (2 + 1) + 6 + 3 = 12
- 9. (a) Explain different types of view of a system captured by UML diagrams.
  - (b) Describe the concept of synchronization used in state chart diagram with suitable diagram.
  - (c) Write the different components required to draw class diagram.

**6 + 4 + 2 = 12**

**SOFTWARE ENGINEERING & PROJECT MANAGEMENT  
(INFO 3103)**

**Time Allotted : 3 hrs**

**Full Marks : 70**

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.*

*Candidates are required to give answer in their own words as far as practicable.*

**Group – A  
(Multiple Choice Type Questions)**

- 1. Choose the correct alternative for the following: **10 × 1 = 10**
  - (i) Which one of the following verification and validation (V and V) activity targets to detect noncompliance to coding standard?
    - (a) Unit testing
    - (b) Code inspection
    - (c) Code walk through
    - (d) System testing.
  - (ii) If the condition expression in a conditional statement is composed of n atomic conditions, what is the number of test cases required to achieve multiple condition coverage?
    - (a) n
    - (b) 2<sup>n</sup>
    - (c) 2 × n
    - (d) 2 × n + 1.
  - (iii) What type of software testing is generally used in Software Maintenance?
    - (a) Regression Testing
    - (b) System Testing
    - (c) Integration Testing
    - (d) Unit Testing.
  - (iv) Which tool is use for structured designing ?
    - (a) Program flowchart
    - (b) Structure chart
    - (c) Data-flow diagram
    - (d) Module.
  - (v) If two code segments have cyclomatic complexities of N1 and N2 respectively, what will be the Cyclomatic complexity of the juxtaposition of the two code segments?
    - (a) N1 + N2
    - (b) N1 + N2 + 1
    - (c) N1 + N2 – 1
    - (d) N1 \* N2.
  - (vi) How many feasibility studies is conducted in Requirement Analysis?
    - (a) Two
    - (b) Three
    - (c) Four
    - (d) None of these.

- (vii) Which of the following UML diagrams has a static view?  
 (a) Collaboration (b) Use case  
 (c) State chart (d) Activity.
- (viii) Which of the following is not an information domain required for determining function point in FPA?  
 (a) Number of user input (b) Number of user inquiries  
 (c) Number of external Interfaces (d) Number of errors.
- (ix) What is related to the overall functionality of the delivered software?  
 (a) Function-related metrics (b) Product-related metrics  
 (c) Size-related metrics (d) None of the mentioned.
- (x) Schedule slippage is a type of  
 (a) Business risk (b) Project risk  
 (c) Technical risk (d) None of the above.

**Group – B**

2. (a) Draw the context level diagram, Level-1 diagram and Level-2 diagram for Hotel Management system.

- (b) Draw the Structure Chart of the following C program :

```
void main()
{
    int n, first = 0, second = 1, next, c;
    printf("Enter the number of terms\n");
    scanf("%d", &n);
    printf("First %d terms of Fibonacci series are:\n", n);
    for (c = 0; c < n; c++)
    {
        if (c <= 1)
            next = c;
        else
        {
            next = first + second;
            first = second;
            second = next;
        }
        printf("%d\n", next);
    }
}
```

**(2 + 3 + 3) + 4 = 12**

3. (a) Identify the characteristics of a good software design technique. Mention the major shortcomings of a DFD model.  
 (b) Differentiate between a structure chart and a flow chart with a proper example.

**(4 + 2) + 6 = 12****Group – C**

4. (a) What do you understand by the term integration testing? Which types of defects are uncovered during integration testing?  
 (b) Draw the control flow graph for the following function named find-max. From the control flow graph, determine its cyclomatic complexity.

```
Int find-max (int i, int j, int k)
{
    int max;
    if (i > j) then
        if (i > k) then max = i;
        else max = k;
    else if (j > k) then max = j
    else max = k;
    return(max);
}
```

**(3 + 3) + (3 + 3) = 12**

5. (a) Distinguish among a test case, a test suite, a test scenario, and a test script.  
 (b) What do you understand by the clean room strategy? What are its advantages?  
 (c) Design the black-box test suite for a function that takes the name of a book as input and searches a file containing the names of the books available in the Library and displays the details of the book if the book is available in the library otherwise displays the message "book not available".

**4 + 4 + 4 = 12****Group – D**

6. (a) Consider a project with four major modules of size 10 KLOC, 6 KLOC, 20 KLOC and 4 KLOC. Use COCOMO to determine development effort, development time. Assume that this project will fall in an organic category. The different cost driver attributes along with their multiplying factors are: