B.E. COMPUTER SCIENCE AND ENGINEERING THIRD YEAR SECOND SEMESTER - 2022

SOFTWARE ENGINEERING

Time : Three hours | Full Marks : 100

Answer Question No.1 and any **FOUR** *from the rest*

1. (a) Iterative Enhancement model combine the benefits of both prototyping and Waterfall models – Justify
   (b) Describe the needs of Technical Feasibility study?
   (c) What is Project control list? Indicate the activities of Project control list.
   (d) What is the function of 'Participation' in Entity Relationship Diagram?
   (e) Indicate the role of 'Data Flow' in DFD.
   (f) Why we measure Reliability of Software in Software Engineering?
   (g) Draw the state transition table, using Markov Reliability model (discrete state and continuous time), of a software system.
   (h) Depth-first integration vs. Breadth-first integration.
   (i) Why we use Link weight for estimating the paths in basis set?
   (j) ∞-testing vs. β-testing [2x10]

2. (a) What is good SRS? Describe the characteristics of a good SRS.
   (b) Why the term Requirement Engineering? What are the types of Requirements? Give one example for each type.
   (c) How the requirements are categories? Give example for each category. [5+7+8]

3. (a) Indicates the factors that are directly or indirectly related to the software quality metric?
   (b) How the internal activity of a module is maintained?
   (c) Compare the activities of spiral model with respect to the waterfall model, prototype model and iterative model. [6+4+10]

4. Failure data for 10 hypothetical electronic components are given in the accompanying table. Calculate the following quantities: [20]

The hazard function, z(t)
The density function, f(t)
The cumulative distribution function, F(t)
The reliability function, R(t)

Failure data for 10 hypothetical electronic components

Failure Number	Operating Time, h
1	8
2	20
3	34
4	46
5	63
6	86
7	111
8	141
9	186
10	266

5. (a) Define "Cyclomatic Complexity". Find out the cyclomatic complexity of the of the following program logic (in the form of Structured English): by flowgraph method and graph matrix method. Also find out the basic path set.

```
Integer X1, X2, X3
Read X1, X2, X3
If (X1>X2) then
        If (X1>X3) then
            Print X1
         Else
            Print X3
 Else
        If (X2>X3) then
            Print X2
         Else
            Print X3
 Print "MAX"
 Stop
```

(b) Find out the link weight of the above flowgraph. [(2+10+3)+5]

6. (a) Define software complexity?
(b) Calculate (i) expected program length, (ii) program volume, (iii) critical program volume of the program segment of question number 5(a): [2+18]

7. (a) What is Availability?
(b) Establish the relationship when time tends to infinity with a single component repairable system.
Steady State Availability, Ass(t) = MTTF/(MTTF+MTTR)
(c) Describe various types of software redundancy with example. [2+12+6]

8. Write short notes on (any four): [5x4]
(a) Black Box Testing
(b) Regression Testing
(c) Software failure modes
(d) Complete Repair Time of a software
(e) Effort Adjustment Factor
(f) Conservation of data for process and for Store
(g) Transformed centered Structured Chart
(h) COCOMO Model