

M.E. COMPUTER SCIENCE AND ENGINEERING FIRST YEAR SECOND  
SEMESTER - 2017

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)  $\infty$ -testing vs.  $\beta$ -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 five) : [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