M.C.A. SECOND YEAR FIRST SEMESTER - 2019

SOFTWARE ENGINEERING

Time : Three hours | Full Marks : 100

Answer Question No. **1,7** *and any* **THREE** *from the rest*

1. (a) Iterative Enhancement model vs. Prototype model
   (b) Depth-first integration vs. Breadth-first integration
   (c) Object point vs. Lines of Code in size estimation technique
   (d) Cardinality vs. Participation in Entity Relationship Diagram
   (e) ∞-testing vs. β-testing [5x4]

2. (a) What is good SRS? Describe the characteristics of a good SRS
   (b) Why need Feasibility Study?
   (c) How the requirements are categories? Give example for each category [6+4+10]

3. (a) Define software Availability. Draw the State Diagram and State Transition Table using Markov Availability model (discrete state and continuous time) of a software system
   (b) Estimate MTTF, when constant hazard. [2+8+10]

4. (a) Define software reliability. Estimate the reliability of a system, when time is continuous random variable and Hazard function is linearly increasing.
   (b) Determine the reliabilities, of the following cases, of a electronic component which is operated by a software program

   CASE –I : If the hazard function is constant, λ, where $\lambda = 0.3$ and $t = 3$ hour, time to failure of the software.

   CASE – II : If the hazard function is linearly increasing, kt, where $k = 0.9$ and $t = 5$ hour, time to failure of the software.

   CASE – III : If the hazard function is Weibull distribution, $kt^{(m+1)} / (m+1)$, where $m = 0.5$, $k = 0.9$ and $t = 5$ hour, time to failure of the software.

   Each of the above case plot a two dimensional graph reliability vs. time to failure (1h, 2h, 3h, 4h, 5h, 6h, 7h, 8h, 9h, 10h) [10+10]

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.

```
Read N
Max = 0
I = 1
While I <= N
Read X(I)
If X(I) > Max
 Then Max =X(I)
 I = I+1
Print Max
```

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

6. (a) Define software complexity ? [2+18]

(b) Calculate (i) actual program length, (ii) expected program length, (iii) program volume, (iv) critical program volume, (v) program effort and (vi) program time (if speed is 10 sec.) program segment in question no.5(a)

7. Write short notes on (any four) : [5x4]

(a) Regression Testing
(b) Mills' Theorem
(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) Transaction centered Structured Chart