M.C.A. SECOND YEAR FIRST SEMESTER - 2018

SOFTWARE ENGINEERING

Time : Three hours | Full Marks : 100

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

1. (a) Waterfall Model vs. Iterative Enhancement model
   (b) Unstructured Programming vs. Structured Programming
   (c) Object point vs. Lines of Code in size estimation technique
   (d) Cardinality vs. Participation in Entity Relationship Diagram
   (e) Data Store vs. Data dictionary in DFD [5x4]

2. (a) Why the term Requirement Engineering? What are the types of Requirements? Give one example for each type.
   (b) Why need Feasibility Study?
   (c) How Spiral Model solve the problem of requirements? [6+4+10]

3. (a) Define software Availability. Establish the relationship when time tends to infinity with a single component repairable system. Steady State Availability, Ass(t) = MTTF/(MTTF+MTTR)
   (b) Estimate MTTF, when constant hazard. [2+10+8]

4. (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]

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

(a) The hazard function, z(t)
(b) The density function, f(t)
(c) The cumulative distribution function, F(t)
(d) 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

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.4(a)

7. Write short notes on (any five) : [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
(h) COCOMO Model