*Name* : .....

*Roll No.* : .....

*Invigilator's Signature* : .....

**CS/MCA/SEM-4/MCA-401/2013**

**2013**

# SOFTWARE ENGINEERING AND TQM

*Time Allotted* : 3 Hours *Full Marks* : 70

*The figures in the margin indicate full marks.*

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

## GROUP – A

## ( Multiple Choice Type Questions )

1. Choose the correct alternatives for the following : 10 × 1 = 10

i) Barry Boehm proposed

a) Waterfall model b) V model

c) Spiral model d) Prototype model.

ii) Which of the following is an essential feature of the RAD model ?

a) Risk Managment b) Reuse of code

c) Quality Management d) Change Management.

iii) SADT stands for

a) Software Analysis and Development Technique

b) Structured Analysis and Design Technique

c) System Analysis and Design Technique

d) Structured Analysis and Development Technique.

iv) Which of the following is not a technique used in software maintenance ?

a) Re-engineering

b) Reverse engineering

c) Technology change management

d) Software configuration management.

v) Which model(s) is/are included in ISO 9000 series ?

a) ISO 9001 b) ISO 9003

c) Both (a) and (b) d) ISO 60979.

vi) Which is desirable ?

a) High coupling, Low cohesion

b) High coupling, High cohesion

c) Low coupling, Low cohesion

d) Low coupling, High cohesion.

vii) In object oriented approach, a system is designed as a set interacting

a) Class b) Objects

c) ADT d) Class and objects.

viii) Linearly independent path is required to calculate the

a) Cyclomatic complexity

b) Software size

c) Reliability

d) None of these.

ix) CASE tools include tools for

a) Documentation b) Risk analysis

c) Programming d) All of these.

x) Stress testing is

a) done for boundary values

b) done for measuring performance

c) done to determine the load under which it fails

d) none of these.

## GROUP – B
## ( Short Answer Type Questions )

Answer any *three* of the following. 3 × 5 = 15

2. What are the shortcomings of LOC ? What is the necessity of a feature point metric in the context of software project size estimation ? 3 + 2

3. State the McCall's quality factors. What are the different types of diagrams and views supported by UML ? 2 + 3

4. What does the term 'balancing a DFD' mean ? Give an example to explain your anwer. 2 + 3

5. What is system testing ? How can CASE tool help for the purpose of test case generation ? 2 + 3

6. What is code walkthrough ? Explain WBS with example. 2 + 3

## GROUP – C
## ( Long Answer Type Questions )

Answer any *three* of the following. 3 × 15 = 45

7. a) Identify six different phases of a classical waterfall model. Mention at least two reasons as to why classical waterfall model can be considered impractical and cannot be used in real projects.

   b) What is a software prototype ? Identify three reasons for the necessity of developing a prototype during software development.

   c) Write down the two advantages of using spiral model. 3 + 3 + 5 + 4

8. a) Identify four characteristics of a good software design technique.

   b) Consider Library Membership Automation Software ( LMS ) where it should support the following three options : New member, Renewal, Cancel membership. Design the decision tree and decision table of the above mentioned problem.

   c) Document the functional requirement of the withdraw cash function of an ATM. 4 + 6 + 5

9. a) The development effort for a software project is 500 person-months. The empirically determined constant ( $k$ ) is 0.3. The complexity of the code is quite high and is equal to 8. Calculate the total effort expended ( M ) if
   i) maintenance team has good level of understanding of the project ( $d = 0.9$ )
   ii) maintenance team has poor understanding of project ( $d = 0.1$ )

   b) Assume that the size of an organic type software product has been estimated to be 32,000 lines of source code. Assume that the average salary of software engineers be Rs. 15,000/- per month. Determine the effort required to develop the software product, the nominal development time and the cost.

   c) What is performace testing ? Discuss briefly three types of performance testing. 5 + 6 + 4

10. a) What is cyclomatic complexity ? For the given code, calculate the cyclomatic complexity by using all three approaches :

```
1.  void main()
2.  {
3.  int a,b,c;
4.  cout << "Enter any two numbers";
5.  cin >> a>>b;
6.  if (a > b)
7.  {
8.  cout << "Largest no. is ="<<a;
9.  }
10. else
11. cout << "Largest no. is = "<<b;
12. }
```

b) What are the software quality assurance activities ?

c) A software project has 5000 SLOC and it took 400 work-days to implement. Some problems increase 100 SLOC and took 20 work-days to implement. Calculate the extendibility of the software project.

6 + 4 + 5

11. a) What is black-box testing ? Give two examples of equivalence class partitioning and boundary value analysis.

b) What is code walk through and what is system testing ?

c) Compute the function point value for a project with the following information domain characteristics :

Number of user inputs : 23

Number of user outputs : 60

Number of user inquiries : 24

Number of files : 10

Number of external interfaces : 05

Assume that all complexity adjustment values are average. 5 + 6 + 4