Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/MCA/SEM-4/MCA-401/2010

2010

SOFTWARE ENGINEERING & TOTAL QUALITY MANAGEMENT

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 any *ten* of the following : 10 × 1 = 10

i) According to the COCOMO model, which is the most fundamental attribute of a software product, based on which size and effort are estimated ?

a) Cost b) LOC

c) Person-month d) none of these.

ii) To allocate resource to activities we use

a) PERT chart b) Network diagram

c) Gantt Chart d) all of these.

iii) Depiction of the interactions among objects during a certain period of time best describes a

a) sequence diagram b) composition diagram

c) deployment diagram d) class diagram.

iv) Which of the following is not indicated on a DFD ?

a) Processing b) Sources

c) Timing d) Data storage.

v) Phase containment of errors

a) minimises the cost to fix errors

b) maximises the cost to fix errors

c) will increase error thereby increasing the cost

d) none of these.

vi) Evolutionary model is sometimes known as

a) meta model

b) successive version and incremental model

c) both (a) and (b)

d) none of these.

vii) DFD should not contain any

a) flow of information b) bubble

c) process d) loops.

viii) Microsoft Project 2000 is a/an

a) Operating System b) CASE Tool

c) Database d) Spread sheet.

ix) Activities of a software project can be identified by

a) SRS document

b) SPMP document

c) task planning sheet

d) work breakdown structure.

x) 'Gold Plating' is a

a) risk item

b) configuration management scheme

c) cost estimation method

d) none of these.

xi) Linearly independent path is required to calculate the

a) cyclomatic complexity

b) software size

c) reliability

d) none of these.

xii) A test case should have

a) data input b) state of the system

c) expected output d) all of these.

xiii) Which one of the following can be used to relate the number of delivered lines of code to the effort and time required to develop the software ?

a) Zigzag curve b) Rayleigh-Norden curve

c) Sigmoid curve d) Regression curve.

xiv) To determine the reliability of the product rather than discovering errors we do

a) regression testing b) mutation testing

c) stress testing d) statistical testing.

xv) Which CMM level focuses on 'Project management' ?

a) Initial b) Managed

c) Optimized d) Repeatable.

GROUP – B

(Short Answer Type Questions)

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

2. Explain when you should use PERT charts and when you should use Gantt charts while you are performing the duties of a project manager. What is CPM ? 2 + 2 + 1

3. What is Mutation Testing ? Find the estimated length of the following *C* program :

```
main ()
{
int a,b,c,avg;
scanf("%d%d%d",&a,&b,&c);
avg = (a+b+c)/3;
printf("avg=%d",avg);
}
```

2 + 3

4. Represent the following relations among classes using UML diagram :

a) Students credit 5 courses each semester. Each course is taught by one or more teachers.

b) Bill contains number of items. Each item describes some commodity, the price of unit and total on this price. 2 + 3

5. Differentiate between a structure chart and a flow-chart. State two major design activities. 3 + 2

6. Without developing an SRS document an organization might face severe problems. Identify those problems. What are the non-functional requirements ? 3 + 2

GROUP – C

(Long Answer Type Questions)

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

7. a) Identify the definite stages through which a software product undergoes during its lifetime.

   b) 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.

   c) Write down a comparison of different life cycle models. 3 + 5 + 3 + 4

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

   b) Write down some essential activities required to develop the DFD of a system more systematically.

   c) What does the term 'balancing a DFD' mean ? Give an example to explain your answer. 4 + 6 + 5

9. a) What is software metric ? State two software metrics for project size estimation. What are the shortcomings of LOC ?

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

Number of user inputs	:	42
Number of user outputs	:	70
Number of user inquiries	:	22
Number of files	:	09
Number of external interface	:	03

Assume that all complexity adjustment values are complex.

c) What do you mean by crashing of a project ? Give an example. 5 + 6 + 4

10. a) What is Cyclomatic complexity ?

For the given code, calculate the cyclomatic complexity by using all three approaches :

```
1.  cin>>a>>b>>c;
2.  if(a>10)
3.  {
4.  cout<<"Hello";
5.  if(b<a)
6.  {
7.  cout<<"a";
8.  if(c>a)
9.  {
10. cout<<"c";
11. }
12. }
13. else
14. {
15. cout<<"b";
16. }
17. }
18. cout<<"H";
```

b) What are the software quality assurance activities ?

c) Suppose *ABC* Ltd. wants to develop a system which consists of 200 KLOC. Evaluate the development time and effort for the organic and embedded COCOMO model. 6 + 3 + 6

11. a) What is black-box testing ? Design the black-box test suite for the following program :

The program computes the intersection point of two straight lines and displays the result. It reads two integer pairs (m1, c1) and (m2, c2) defining the two straight lines of the form $y = mx + c$.

b) What is code walk throughs ?

c) What is system testing ? How can CASE tool help for the purpose of test case generation ? 6 + 4 + 5