



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 :
 $10 \times 1 = 10$
- 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.



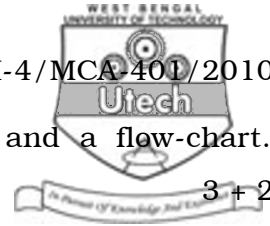
- xiv) To determine the reliability of the product rather than discovering errors we do
- a) regression testing
 - b) mutation testing
 - c) stress testing
 - d) statistical testing.
- xv) Which CMM level focuses on 'Project management' ?
- a) Initial
 - b) Managed
 - c) Optimized
 - d) Repeatable.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

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

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