



Name : .....  
Roll No. : .....  
Invigilator's Signature : .....

**CS/B.Tech (IT)/NEW/SEM-6/IT-603/2013**  
**2013**  
**SOFTWARE ENGINEERING**

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) Which of the following life cycle models deals with risks associated with software products ?
  - a) Prototyping model      b) Waterfall model
  - c) Spiral model            d) Incremental model.
- ii) When a system interfaces with other types of systems then that time the testing that will be required is
  - a) volume testing            b) configuration testing
  - c) compatibility testing    d) maintenance testing.
- iii) The best type of cohesion is
  - a) coincidental                b) logical
  - c) sequential                  d) functional.



- iv) The most desirable form of coupling is
  - a) control
  - b) common
  - c) data
  - d) stamp.
- v) Functionality of software is tested by
  - a) white-box testing
  - b) glass-box testing
  - c) black-box testing
  - d) none of these.
- vi) Which of the following is not a characteristic of software ?
  - a) Availability
  - b) Maintainability
  - c) Usability
  - d) Efficiency.
- vii) Critical path method is a task of
  - a) Project Planning
  - b) Project Scheduling
  - c) Risk management
  - d) Configuration management.
- viii) In function point analysis, number of complexity adjustment factors is
  - a) 10
  - b) 20
  - c) 14
  - d) 12.
- ix) A context diagram
  - a) describes the context of a system
  - b) is a DFD that gives an overview of a system
  - c) is a detailed description of a system
  - d) is the base of object oriented design.



- x) Structured English is
  - a) structured programming language
  - b) description of process in simple English
  - c) natural language based algorithmic language
  - d) structured query language
- xi) The Capability Maturity Model is defined by
  - a) IEEE
  - b) ISO
  - c) SEI
  - d) None of these.
- xii) To allocate resource to activities we use
  - a) PERT chart
  - b) Gantt chart
  - c) Network diagram
  - d) All of these.

### GROUP – B

#### ( Short Answer Type Questions )

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

- 2. What is feasibility study ? Explain different types of feasibility studies.  $2 + 3$
- 3. What is the difference between black-box and white-box testing ?
- 4. Why is COCOMO called Heuristic Estimation Technique ?

Assume that the size of an organic type software product has been estimated to be 48000 lines of source codes. Assume that the average salary of software engineers is Rs. 18,000 per month. Determine the effort required to develop the software product, total cost and the nominal develop time.

$1 + 4$



5. a) “Loosely coupled and strongly cohesive system is our target” – explain. 3 + 2
- b) Explain the structure of a Data Dictionary. 3 + 2
6. a) Differentiate between Verification and Validation. 2 + 3
- b) Explain Bottom-up design approach. 2 + 3

### GROUP – C

#### ( Long Answer Type Questions )

Answer any *three* of the following.  $3 \times 15 = 45$

7. a) What is COCOMO ? What are the different categories of software development projects according to COCOMO ? 2 + 3
- b) Consider a project with four major modules of size 10 KLOC, 6 KLOC, 20 KLOC and 4 KLOC. Use COCOMO to determine development effort, development time. The different cost driver attributes along with their multiplying factors are 6
- |      |                         |      |   |      |
|------|-------------------------|------|---|------|
| i)   | Complexity              | High | : | 1.15 |
| ii)  | Reliability             | High | : | 1.15 |
| iii) | Experience              | Low  | : | 1.13 |
| iv)  | Programmer's Capability | Low  | : | 1.17 |
- c) What are the advantages of function points over the size metric of LOC ? 4
8. a) Define Unit testing, Integration testing and System testing. 2 + 2 + 2



- b) Consider the following program statement :

```
void sort (int a [ ], int n)
{
    int i, j, temp;
    for (i = 0; i < n-1; i++)
        for (j = i + 1; j < n; j++)
            if(a[i] > a[j])
            {
                temp = a[i];
                a[i] = a[j];
                a[j] = temp;
            }
}
```

Draw the control flow graph for the program segment.  
Determine the cyclomatic complexity for the program. 6

- c) Describe the role of a 'System Analyst'. 3
9. a) Draw the context diagram and Level-1 DFD for Library Management System. Draw also Use-Case diagram for this system. 5 + 2
- b) Explain WBS, Gantt chart and PERT chart. 5
- c) Briefly explain team structures and organization process. 3
10. a) A marketing company wishes to construct a decision table to decide how to treat clients according to three characteristics : Gender, City and Age [A (under 30), B (Within 30-60) and C (above 60)]. The company has four market products for test (W, X, Y and Z). Product W will appeal to female city dwellers. Product X will appeal to young females. Product Y will appeal to middle aged males who do not live in cities. Product Z will appeal to all but older females.  
Make a decision table for the above. 5



- b) Draw an ER Diagram for Hospital Management System showing cardinalities, strong and weak entities, derived attributes, primary key etc. 5

- c) Draw the Structure Chart of the following program :

```
for_sum()
{
    int i, sign = 1;
    float s = 0;
    for (i = 0; i < 5; i++)
    {
        s = s + ( (sign) * i / factorial (i) ) ;
        sign = sign - - ;
    }
}
```

5

11. A college runs a student admission system every year for a batch of 30 students for the first year of M.Tech. in IT course. The procedure includes announcement of the admission in the newspaper advertisement. Applications are invited from the candidates. Written test is administered and a list of 30 qualified students is pasted on the notice board. The selected students are asked to pay an amount of Rs. 15,000/- fee within a week from the date of the notice of the final list.

In this domain perform the following actions :

- a) Identify actors
- b) Develop three use cases
- c) Complete the class diagram with properties
- d) Draw interaction diagram
- e) Draw activity diagram
- f) Draw total system diagram with packages.

2 + 2 + 2 + 3 + 3 + 3



12. Write short notes on any *three* the following : 3 × 5

- a) User Interface Design
- b) CASE tools and its applications
- c) Feasibility Analysis
- d) Alpha and Beta Testing
- e) Structured English
- f) McCabe's Cyclomatic Complexity.

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