

NATIONAL INSTITUTE OF TECHNOLOGY, ROURKELA
MID-TERM EXAMINATION, SPRING SEMESTER- 2017
ANSWER ALL QUESTIONS

All Parts of a question should be answered at one place.

SUBJECT: Software Engineering FULL MARKS : 30	DEPT. CODE: CS 412 Duration of Examination: 2 Hours
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- [1] What is SDLC? What are the most common SDLC methodologies? What is Agile development model? When to use Agile model? Discuss advantages and disadvantages of Agile development model? [3]
- [2] How does the Spiral model overcome the limitation of the Waterfall cycle model and the V-shaped cycle model? Why is the Spiral model only appropriate for large-scale and mission critical applications? [3]
- [3] Explain the concept of function points. Why FPs are becoming acceptable in industry? Compute the function point FP for a payroll program that reads a file of employee and a file of information for the current month and prints pay slip for all the employees. The program is capable of handling an interactive command to print an individually requested pay slip immediately. [3]
- [4] How Unadjusted Function Point (UFP) are computed for a given project. How function point is calculated using UFP. For an application that has the following:
10 low external inputs, 12 high external outputs, 20 low internal logical files, 15 high external interface files, 12 average external inquiries, and a value of complexity adjustment factor of 1.10.
 What are the unadjusted and adjusted function point counts? [3]
- [5] Using the basic COCOMO model, under all three operating modes, determine the performance relation for the ratio of delivered source code lines per person-month of effort. Determine the reasonableness of this relation for several types of software projects.
 The effort distribution for a 240 KLOC organic mode software development project is: product design 12%, detailed design 24%, code and unit test 36%, integrate and test 28%. How would the following changes, from low to high, affect the phase distribution of effort and the total effort: analyst capability, use of modern programming languages, required reliability, and requirements volatility? [3]
- [6] What are disadvantages of basic COCOMO model? Explain the cost drivers and EAF of the intermediate COCOMO model. Suppose that a project was estimated to be 600 KLOC. Calculate the effort and development time for each of the three modes i.e., organic, semidetached and embedded. [3]

- [7] What are various activities during software project planning? Describe any two software size estimation techniques? [3]
- [8] Suppose a system for office automation is to be designed. It is clear from requirements that there will be five modules of size 0.5 KLOC, 1.5 KLOC, 2.0 KLOC, 1.0 KLOC and 2.0 KLOC respectively. Complexity, and reliability requirements are high. Programmer's capability and experience is low. All other factors are of nominal rating. Use COCOMO model to determine overall cost and schedule estimates. Also calculate the cost and schedule estimates for different phases. [3]
- [9] What is unified process? Explain various phases along with outcome of each phase? Describe the unified process work products after each phase of unified process?
- [10] Consider the following program. Generate five mutants and design test cases taking into account each mutant, using mutation testing. Calculate mutation score of your test suite. The instrumented program is given below.

```

1 main(){
    float x,y,z;
2 printf ("Enter values of three variables x,y,z");
3 scanf ("%f%f%f",&x,&y,&z);
4 if(x>y) {
5 if(x>z)
6 printf ("%d is greatest",x);
    else
7 printf ("%d is greatest",z);
    }
    else{
8 if(y>z)
9 printf ("%d is greatest",y);
    else
10 printf ("%d is greatest",z);
    }
11 }

```

Consider the test suite				
Sl. No.	X	Y	Z	Expected Output
1	6	10	2	10
2	10	6	2	10
3	6	2	10	10
4	6	10	20	20

[3]

