

## Software Engineering (CS-308, Dec-2007)

**Note:** Section A is compulsory. Attempt any four questions from Section-B and any two from Section-C.

### Section-A

1. a) Define software engineering as defined in IEEE 610.12.1990 standard.
- b) Write four advantages of using software engineering for development of software.
- c) Name four popular process maturity frameworks and quality standards.
- d) How are software projects different from other projects?
- e) List the four major activities in project management process.
- f) Explain the formulae used for effort estimation by basic COCOMO model.
- g) Risks are events that may lead to project failure or delay. Name any four risks.
- h) Define Software requirement.
- i) One way to measure the design quality of structure chart is to explore its coupling and cohesion. Differentiate between the two.
- j) What is a context diagram?

### Section-B

2. What are the five levels of CMM? List important features of each of these levels.
3. Describe a Data Flow Diagram. Explain the approaches used to build the DFDs.
4. As software project manager, you have been asked to compute the earned value statistics for a small software project. The project has 48 planned work tasks that are estimated to require 524 person days to complete. At the time of analysis, 7 tasks have been completed. Project schedule indicates that 10 tasks should have been completed. The following scheduling data are available.

Task	1	2	3	4	5	6	7	8	9	10
Planned Effort	12.0	14.0	11.0	9.0	7.5	18.0	10.0	4.0	12.0	5.0
Actual Effort	11.5	13.0	15.0	9.5	9.0	19.0	11.0	--	--	--

Compare the schedule performance index, schedule variance, Percent scheduled for completion, Percent Complete and Cost Performance Index for the project.

5. For basic execution time model it is given that failure intensity at the start of execution  $\lambda_0 = 60$  failures/ CPU hour and number of failures that occur in infinite time  $v_0 = 140$  failures. Compute additional failures and additional execution time required to reach a failure intensity objective of 15 failures/CPU hour.
6. Explain the project management process.

### Section-C

7. Draw the general architecture of CASE environment. Explain its important characteristics.
8. (a) Consider the program code given below.  

```
int sum i;  
sum = 0;  
for (i=1; i<=20; i++)  
sum = sum+i;  
printf (sum);
```

Complete Halsted software science metrics, for the effort E and time T, required to implement the program.

(b) Explain a fat client and fat server design?

9. (a) Size and cost drivers for a software project are given below:

Size = 250 KLOC

**Cost drivers:**

Analyst capability = 1.26

Use of software tools = 0.85

Product complexity = 0.93

Execution time constraint = 1.00

Calculate the effort for three types of projects e.g. organic, semidetached and embedded using COCOMO model.

(b) With the help of a diagram explain a software reengineering process.

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