

## B3.3-R4: SOFTWARE ENGINEERING AND CASE TOOLS

### NOTE:

1. Answer question 1 and any FOUR from questions 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

**Time: 3 Hours**

**Total Marks: 100**

**1.**

- a) Identify the two important techniques that software engineering uses to tackle the problem of exponential growth of problem complexity with its size and state the problem one would face, if he tries to develop a large software product without using software engineering principles.
- b) Why SDLC is important in Developing Large Software Projects? List and explain various phases of SDLC.
- c) What are the Project Estimation Parameters? List three main techniques of Project Estimation Parameters and explain any one of them.
- d) List out the major shortcoming of function point metric in order to use it as a software project size metric and what is the necessity of a feature point metric in the context of software project size estimation?
- e) State Advantages and Disadvantages of Client-Server Software Development.
- f) What is CASE Tool? Write its scope and reasons for using CASE Tools.
- g) Give Five Maturity Levels of SEI CMM Software Model.

**(7x4)**

**2.**

- a) Identify at least two activities carried out during each phase of a Spiral Model. Write down the advantages of Spiral Model.
- b) Why object oriented techniques are needed for the development of the software? List out the different types of UML Diagrams used during the various phases of Software Development Life Cycle (SDLC). Also explain with examples in detail about all the UML diagrams that represent only the dynamic aspects of the software system with example.
- c) Write down Salient features of ISO 9001 certification and shortcomings of it.

**(6+6+6)**

**3.**

- a) Explain the purpose of different types of objects identified during domain analysis. Explain how these objects interact among each other.
- b) Write down the five characteristics of the Clean Room Approach to Software Development.
- c) Identify the necessity of CRC (Class-Responsibility-Collaborator) cards in the context of object-oriented design.

**(8+6+4)**

**4.**

- a) Differentiate Control Flow Oriented and Data Flow Oriented Design Techniques. Give advantages of Object Oriented Design Techniques.
- b) Identify the use of algebraic specifications in the context of requirements specification. Write the important Properties that every good Algebraic Specification should possess.
- c) Why is maintenance of software important? Discuss some of the problems that are faced during maintenance of software.

**(6+6+6)**

- 5.
- a) Assume that the size of an organic type software product has been estimated to be 32,000 lines of source code. Assume that the average salary of software engineers be Rs. 15,000/- per month. Determine the effort required to develop the software product and the nominal development time.
  - b) Define software testing. Differentiate between functional testing and structural testing and state the limitations of testing.
  - c) Why is SRS also known as the black-box specification of system?
- (4+8+6)**

- 6.
- a) What do you mean by functional independence in the context of software design? Write advantages of it. Why is it good idea to keep the scope of effect of a module within its scope of control?
  - b) What is CMM? Describe its levels & compare it with ISO 9001?
- (9+9)**

- 7.
- a) What do you understand by black box testing? Explain:
    - i) Equivalence class
    - ii) Equivalence partitioning
  - b) Consider the program given below:

```
void main()
{
    int i,j,k;
    readln (i,j,k);
    if( (i < j) || ( i > k) )
    {
        writeln("then part");
        if (j < k)
            writeln ("j less then k");
        else writeln ( " j not less then k");
    }
    else writeln( "else Part"); }
```

- i) Draw the control flow graph (CFG).
    - ii) Determine the cyclomatic complexity.
    - iii) Arrive at all the independent paths.
  - c) How is cyclomatic complexity useful in program test? What is sequence of testing? What is testability?
- (6+6+6)**