

Instruction: Answer any five questions.

1. a) What are the limitations of Waterfall model?
- b) What is a Prototype? Under what circumstances it is beneficial to use Prototyping model?
- c) A software project involves execution of 5 tasks T1, T2, T3, T4 and T5 of duration 20, 25, 28, 40 and 50 days, respectively. T2 and T4 can start only after T1 completes. T3 can start after T2 completes. T5 can start only after both T3 and T4 complete. Draw the diagram and find out the slack time of the task T3.
- d) List different techniques for Data and fact gathering.
- e) What are the different types of Feasibility study?
- f) Define Cohesion. Discuss the classification of Cohesion. [2+4+4+2+2+6]

2. a) Explain Spiral model with diagram. What are the advantages of using Spiral model?
- b) Define Function point metric. What is the necessity of Feature point metric in the context of software project size estimation?
- c) Consider a software whose Mean Time Between Failure (MTBF) is 25 days and Mean Time To Repair (MTTR) is 6 hours. Calculate the availability of the software.
- d) Categorize different kinds of Risks in a software project. Discuss Risk Management techniques. [6+4+4+6]

3. a) What is meant by Critical path with respect to PERT chart?
- b) Discuss the advantages and limitations of CASE Tools.
- c) Define Software Quality. What are the attributes of software quality?
- d) A list of employees with their basic pay is forwarded to an accounts assistant. He calculates the gross pay using standard allowances which are known for each pay slab. Deduction statements such as loan, advances taken etc. are sent to another accounts assistant who matches these slips with the slips of gross pay and calculates net pay. Finally, these slips are used by a third accounts assistant whose job is to write out pay cheques for each employee and sent to respective employees. The total bills paid are also computed. Draw the level 0, level 1 & level 2 (if necessary) DFDs for the above billing system. State your assumptions clearly. [2+4+5+9]

4. a) Explain different types of Black Box Testing techniques with example.
- b) What is the significance of McCabe's Cyclomatic Complexity metric?
- c) Draw the CFG of the following code segment and find Cyclomatic complexity by applying all three approaches.

```
int main()
{
    int n, i;
    int factorial = 1;
    printf("Enter an integer: ");
```

```

scanf("%d",&n);
if (n < 0)
    printf("Error! Factorial of a negative number doesn't exist.");
else
{
    for(i=1; i<=n; ++i)
    {
        factorial *= i;
    }
    printf("Factorial of %d = %d", n, factorial);
}
return 0;
}

```

d) A software was tested using the error seeding strategy in which 40 errors were seeded in the code. When the code was tested using the complete test suite, 16 of the seeded errors were detected. The same test suite also detected 200 non-seeded errors. What is the estimated number of undetected errors in the code after this testing?

e) What are the differences between Functional and Non-functional requirements in an SRS?

[5+2+5+5+3]

5. a) What is the difference between Alpha testing and Beta testing?

b) What do you understand by the term 'Regression testing'? When is Regression testing done?

c) What is a Legacy software product?

d) What is Data Dictionary?

e) The availability of a software is 90%. Its Mean Time Between Failure (MTBF) is 200 days. Because of the critical nature of the usage, the organisation deploying the software further enhanced it to obtain an availability of 95%. In the process, the Mean Time To Repair (MTTR) is increased by 5 days. What is the MTBF of the enhanced software?

f) State different Debugging approaches.

g) What is Software Configuration Management? What is the necessity of Software Configuration Management in developing software?

[2+3+1+2+5+2+5]

6. Write brief notes on **any four** of the following:

a) Reengineering

b) SEI Capability Maturity Model

c) Formal Technical Review

d) ISO 9000

e) Mutation Testing

[5+5+5+5]