

## CE6-R3: SOFTWARE QUALITY MANAGEMENT

### NOTE:

1. Answer question 1 and any FOUR questions from 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) Distinguish between software verification and software validation. When are verification and validation performed during the software life cycle?
- b) Why is technical review process required? State the input and output requirements to the technical review process.
- c) State the objective of risk management. What kinds of information are included in risk analysis report?
- d) Do the reliability models actually measure reliability or estimate it from some other measurement?
- e) Defect prevention is crucial to the software process? Explain briefly.
- f) Bring out the differences between ISO 9000 and SEI CMM quality models.
- g) Software development and testing are dominated not by the design of new software but by rework and maintenance of existing software. Bring out the relevance of this statement in the context of regression testing.

**(7x4)**

**2.**

- a) What is the goal of software risk assessment? Categorize software risks and explain each of them.
- b) List important planning activities in the context of large software development project.

**(9+9)**

**3.**

- a) What do you mean by the term 'defect rate'? Explain the concept of defect removal effectiveness.
- b) What is the purpose of software testing? Explain the general guidelines for performing a software testing?

**(9+9)**

**4.**

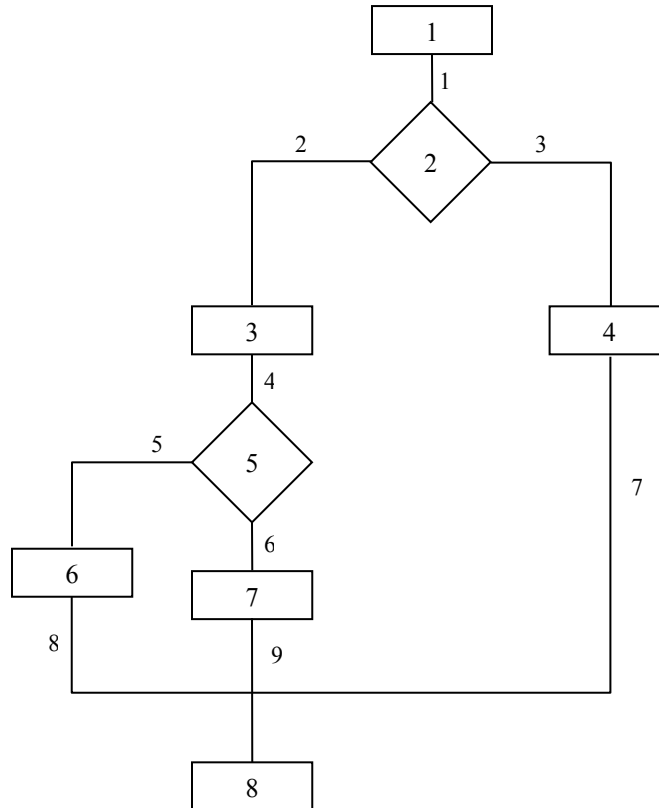
- a) Define Software Reliability? Describe the types of uncertainty addressed in software reliability growth models. State the names of parametric reliability growth models.
- b) What is the use of software metrics in object-oriented software development? How does process related metrics differ from product related metrics. Give at least two example for process and product related metrics.

**(9+9)**

**5.**

- a) Define software cyclometric complexity.

- b) Compute cyclometric complexity for the flowchart given below:



- c) Describe various techniques that help to enhance the software quality.

**(4+8+6)**

**6.**

- What do you understand by hazard rate? Given a hazard rate  $Z(t)$ , how will you compute the reliability  $R(t)$ ?
- Express MTTF in terms of  $R(t)$ . For a Poisson failure process, compute MTTF.
- Discuss an application area where software safety and hazard analysis would be a major concern.

**(6+6+6)**

**7.**

- Taking a suitable example, illustrate the concept of software auditing.
- How does the data collection and analysis help in improving the quality of the software? Write down steps for estimating software quality.
- Suppose you want to buy a certain software product and you have kept a purchase precondition that the vendor must install the software, train your manpower on that and maintain the product for at least a year, only then would you release the payment. Also, you do not foresee any maintenance requirement for the product once it works satisfactorily. Now, you receive bids from three vendors. Two of the vendors quote Rs. 3 Lakhs and Rs. 4 Lakhs respectively, whereas the third vendor quotes Rs 10 Lakhs saying that the prices would be high because they would be following a good development process as they have been assessed at the Level 5 of SEI CMM. Discuss how you would decide whom to award the contract.

**(6+6+6)**