B4.3-R3: SOFTWARE TESTING AND 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 clearly between the terms fault and failure in software development.

b) A pure top-down integration testing is not just sufficient for the software testing process. Justify your answer with a suitable example.

c) What is a code walkthrough and explain, how it is useful in White-Box testing.

d) Describe, how cyclomatic complexity is useful in software testing?

e) Explain, the differences between validation and verification. Why is validation considered a difficult process?

f) How can a Client-Server Software be effectively tested?

g) Explain, why measurement of software reliability is much harder problem than the measurement of hardware reliability.

(7x4)

2.

a) How can you determine the number of latent defects in a software product during the testing phase?

b) Identify the types of information that should be presented in the test summary report.

c) What do you understand by "code review effectiveness"? How can review effectiveness be determined?

(6+6+6)

3.

a) What do you understand by test data generation? Explain, how test data can be generated automatically.

b) Among the different development phases of life cycle, testing typically requires the maximum effort. Identify the main reasons behind the large effort necessary for this phase.

c) Design the black-box test suite for a program that accepts two strings and checks if the first string is a substring of the second string and displays the number of times the first string occurs in the second string.

(6+6+6)

4.

a) What do you understand by static analysis of a program? What are the different types of information that are normally generated by static analysis tools? How are these information useful?

b) Explain how the different defects in a system can be classified. Why is it necessary to classify the defects into several classes?

c) How can we estimate the Cost of Repairing the software defect in a program.

(6+6+6)

5.

a) Usability of a software product is tested during which type of testing: unit, integration, or system testing? How is usability tested?

b) Discuss the relative merits of ISO 9001 certification and the SEI CMM-based quality assessment.

c) What do you understand by Key Process Area (KPA), in the context of SEI CMM? Would there be any problem if an organization tries to implement higher level SEI CMM KPAs before achieving lower level KPAs? Justify your answer using suitable examples.

(6+6+6)

6.

a) What is the difference between process metrics and product metrics? Give four examples of each.

b) Why is testing of real-time and embedded systems is considered more difficult than testing of traditional systems? Explain a satisfactory scheme for testing real-time and embedded systems.

c) What is a coding standard? Identify the problems that might occur if the engineers of an organization do not adhere to any coding standard?

(6+6+6)

7.

a) What do you understand by stress testing? Explain using suitable examples, how stress testing for a software product can be carried out.

b) Explain the importance of software configuration management in modern quality paradigms such as SEI CMM and ISO 9001. An organization not using any configuration management tool can qualify for which SEI CMM level(s)?

c) List four metrics that can be determined from an analysis of a program's source code and would correlate well with the reliability of the delivered software.

(6+6+6)