

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) What do you understand by repeatable software development? Organizations assessed at which level SEI CMM maturity achieve repeatable software development?
- b) Schedule slippage is a very common form of risk that almost every project manager has to encounter. Explain how would you manage the risk of schedule slippage as the project manager of a medium-sized project.
- c) Suppose an organization mentions in its job advertisement that it has been assessed at level 2 of SEI CMM, what can you infer about the current quality practices at the organization? What does this organization have to do to reach SEI CMM level 3?
- d) Define what you understand by software reliability. How can it be measured?
- e) Do you agree with the following assertion: "A highly reliable software is necessarily a good quality software." Explain your answer.
- f) List the different issues that a software quality assurance plan needs to address.
- g) 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.

(7x4)

2.

- a) What do you understand by "total quality management"? How can it be achieved? Does ISO 9001 aim for TQM?
- b) What are the important types of risks that a project might suffer from? How would you identify the risks that a project is susceptible to during project the project planning stage?
- c) Explain the different metrics that can be used to define the defect-density of a program. How can defect density be measured?

(6+6+6)

3.

- a) Explain what do you understand by process improvement process? How is it achieved? Describe three types of software process metric that may be collected as part of a process improvement process. Give one example of each type of metric.
- b) What do you understand by a reliability growth model? How is reliability growth modelling useful during software development?
- c) Define a metric for measuring software complexity. How is this metric related to software quality and testing effort?

(6+6+6)

4.

- a) Suggest two application domains where the SEI capability model is unlikely to be appropriate. Give reasons why this is the case.
- b) Identify some metrics which can be used to determine the process quality.
- c) In a software development organization who is responsible for creating appropriate standards and practices? How are standards and practices enforced?

(6+6+6)

5.

- a) Discuss the salient features of the organizational reporting structure of the SQA (software quality assurance) group as recommended by ISO 9001 and SEI CMM. What is the rationale behind having such reporting structure?
- b) What do you understand by review effectiveness? How is it measured?
- c) Suggest two specialized software tools which might be developed to support a process improvement program in an organization. Explain how they can help process improvement.

(6+6+6)

6.

- a) Explain why program inspections are an effective technique for discovering errors in a program. What types of errors are unlikely to be discovered through inspections?
- b) Explain the metrics that you would use to measure the following factors of an object-oriented program. Also discuss how you would estimate these characteristics:
 - design quality
 - estimated number of faults
 - maintainability
 - estimated test effort
 - estimated program development effort

(8+10)

7.

- a) Discuss the relative merits of ISO 9001 certification and the SEI CMM-based quality assessment for a software organization.
- b) Explain two metrics for software maintenance. How can these help deliver good quality software?
- c) Briefly explain the SPICE quality system. How does it compare with SEI CMM?

(6+6+6)