

**C8-R3: ADVANCED SOFTWARE ENGINEERING**

**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**

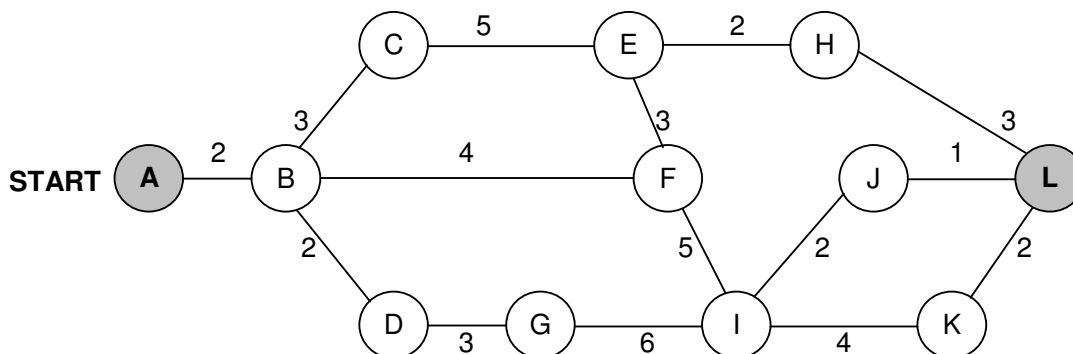
1.
  - a) What is meant by term “non-functional” requirements?
  - b) What are the major benefits of stepwise refinement as a design technique?
  - c) What are the characteristics of good design? List some design tools.
  - d) What are different types of testing methods? How is a test case design?
  - e) What are use cases and class diagrams in Software Engineering?
  - f) Describe the concepts of generalization and inheritance with examples.
  - g) How do coupling, cohesion and modularity effect reliability and traceability?

**(7x4)**

2.
  - a) Explain the following:
    - i) Different types of prototypes
    - ii) Cost estimation
  - b) Does programming languages have an impact on project planning, analysis design, coding, testing and maintenance? Discuss.
  - c) With neat diagram, explain the building blocks in CASE. Bring out the need of software maintenance in brief.
  - d) Distinguish between software engineering and hardware engineering. What is project planning?

**(5+5+5+3)**

3.
  - a) Given below is an activity graph. Find the critical path.



- b) On a software development project, what kinds of activities can be performed in parallel? Explain, why the activity graph sometimes hides the interdependencies of these activities.
- c) Describe, how adding personnel to a project that is behind schedule might make the project completion date even later.
- d) Justify with reasons the software development model which is preferred for the following projects:
  - i) An incremental compiler for Java
  - ii) A clinical-record-keeping system for dentists
  - iii) A word-processing package
  - iv) A guidance system for an interplanetary probe

**(4+3+3+8)**

- 4.
- a) One means of improving system reliability is to have three or more replicated systems and act on their majority output. Give two examples of failure that can be stopped by the mechanism and two which cannot. At least one of each type should be illustrated by an actual case history or application.
  - b) An engineer attempts to improve the reliability of such a system further by multiversion programming – by having three separate systems coded by different teams and possibly in different languages. Discuss what might still go wrong.
  - c) Explain in brief the methods used for eliciting information.
- (6+6+6)**

- 5.
- a) Several organizations do not have their own software development divisions and they outsource the work of Software Development to External Software Development organizations. Is it justified to outsource all types of software projects or should outsourcing be limited to only some categories? Explain your answer.
  - b) Consider the following team structure:  
A senior programmer and some junior programmers form a team that is called a Chief Programmer team. Compare the communication paths in this structure with controlled decentralized structure. What are the advantages and disadvantages of this structure? Under what conditions will you suggest that this structure be used?
  - c) What do you understand by the term integration testing? Which types of defects are uncovered during integration testing? What are the different types of integration testing methods that can be used to carry out integration testing of a large software product? Compare the merits and demerits of these different integration testing strategies.
- (5+5+8)**

- 6.
- a) What is software maintenance? What are various types of maintenance? When does it start and why is it costly? Also, explain various measures through which it can be minimized.
  - b) What special kinds of problems are presented when specifying the requirement of real-time systems? What are the possible solutions?
  - c) Contrast the benefits of an object-oriented requirements specification with those of a functional decomposition.
- (8+5+5)**

- 7.
- a) Software computes the cube root of an input Integer, which can assume values from 1 to 2000. Find the test cases for this program from considerations of:
    - i) Equivalent class partitioning
    - ii) Boundary value analysis
  - b) Annual charge Traffic in software is 30% per year. The initial development cost was Rs. 20 Lakhs. Total lifetime for the software is 10 years. What is the total cost of software systems?
- (9+9)**