

SOFTWARE ENGINEERING
(CSE3201)

Time Allotted : 2½ hrs

Full Marks : 60

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 4 (four) from Group B to E, taking one from each group.*

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) Which diagram is used to model object interactions arranged in chronological order
 - (a) Sequence Diagram
 - (b) Use-case Diagram
 - (c) Context Diagram
 - (d) Activity Diagram
- (ii) Third quadrant in spiral model is where
 - (a) Customer Evaluation is done
 - (b) Actual Development is done
 - (c) Coding is done
 - (d) Design is done
- (iii) Which of the following is NOT a functional requirement of a system?
 - (a) System should respond within 3 seconds
 - (b) User login authentication
 - (c) Generating reports from a database
 - (d) Password reset functionality
- (iv) When the two bubbles are interconnected through the data store, it is referred as
 - (a) Serial DFD
 - (b) Asynchronous DFD
 - (c) Synchronous
 - (d) Balanced DFD.
- (v) In Object-Oriented Analysis and Design (OOAD), which UML diagram represents the structural view of a system?
 - (a) Use Case Diagram
 - (b) Sequence Diagram
 - (c) Class Diagram
 - (d) Activity Diagram
- (vi) If branch coverage has been achieved on a unit under test, which of the following coverage is implicitly implied?
 - (a) Path coverage
 - (b) Multiple condition coverage
 - (c) Statement coverage
 - (d) Data flow coverage.
- (vii) What is the main purpose of the traceability matrix in software testing?
 - (a) To establish a relationship between test cases and requirements
 - (b) To identify code duplication
 - (c) To improve code performance
 - (d) To minimize software licensing issues

- (viii) In function point analysis number of complexity adjustment factors are
 - (a) 12 (b) 13
 - (c) 14 (d) 15
- (ix) In software maintenance cost estimation, which factor significantly impacts effort and cost?
 - (a) Number of users (b) Marketing strategies
 - (c) Software complexity (d) Number of software licenses sold
- (x) What is the significance of "baseline" in configuration management?
 - (a) A snapshot of the software at a specific point in time
 - (b) The first release of the software
 - (c) The last stable version of the software
 - (d) A prototype version

Fill in the blanks with the correct word

- (xi) In Scrum, the short iteration period during which a specific set of tasks is completed is called a _____.
- (xii) In a decision tree, each internal node represents a _____, and each leaf node represents an outcome
- (xiii) A class diagram in UML provides a _____ view of the system.
- (xiv) In an Activity Network, the _____ path determines the shortest time to complete the project.
- (xv) _____ is a process that helps software teams track defects from identification to resolution.

Group - B

2. (a) Discuss the benefits of adopting Agile. [[CO1](Evaluate/HOCQ)]
 (b) Explain for which type of software development Agile is the worst choice? [[CO1](Evaluate/HOCQ)]
 (c) Why Spiral Model is also called a Meta model? [[CO1](Understand/LOCQ)]

4 + 4 + 4 = 12
3. (a) Describe the Scrum workflow. Explain the purpose of **Sprint Planning, Daily Scrum, Sprint Review, and Sprint Retrospective**.
 Briefly explain any two types of Cohesion with example(s). (CO1)(Analyse/HOCQ)]
 (b) Compare Agile Methodology and the Waterfall Model in terms of development approach, requirement changes, customer involvement, and delivery of software. (CO1) (Analyse/HOCQ)]
 (c) Explain the concept of **Use Case Modeling**. Illustrate your answer with a suitable example and identify the actor and use cases involved. [[CO1](Understand/LOCQ)]

4 + 4 + 4 = 12

Group - C

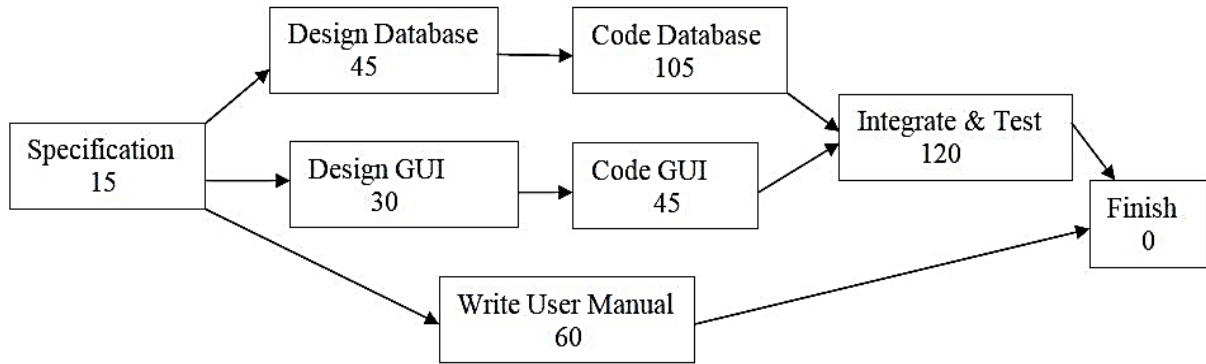
4. (a) What do you mean by Cohesion? Briefly explain any two types of Cohesion with example(s). [[CO2](Understand/LOCQ)]
(b) What is coupling? Briefly explain any two types of Coupling with example(s). (CO2) (Understand/LOCQ)]
(2 + 4) + (2 + 4) = 12
5. A university plans to develop an automated admission system. The system should allow students to apply for multiple courses, track their application status, and submit required documents. Admission officers should be able to review applications, approve/reject candidates, and assign interview slots if needed. Professors should have access to student details once admitted. Payment processing for application fees should also be integrated.
(i) Draw a Use Case Diagram representing the major functionalities of the system. [[CO2](Create/IOCQ)]
(ii) Identify and describe at least three key actors (students, admission officers, professors) and their roles in the system. [[CO2](Analyse/LOCQ)]
(6 + 6) = 12

Group - D

6. (a) With an example show how equivalence class partitioning helps us to have a good test suite? [[CO3](Understand/LOCQ)]
(b) With an example explain how boundary value analysis is done? [[CO3] (Apply/IOCQ)]
(c) With an example compare and contrast between branch coverage and path coverage. [[CO4] (Understand/LOCQ)]
(d) What is a linearly independent path? [[CO2] (Remember/LOCQ)]
3 + 3 + 4 + 2 = 12
7. (a) A software development team is building an e-commerce platform but is facing delays due to unclear requirements and resource unavailability.
(i) Identify and explain three major software project risks in this situation.
(ii) Suggest two risk mitigation techniques for managing these risks. [[CO6](Evaluate/IOCQ)]
(b) Pair Programming improves software quality - Do you agree or disagree? Explain your justifications. [[CO3](Evaluate/IOCQ)]
(4 + 4) + 4 = 12

Group - E

8. (a) How does COCOMO II (or intermediate COCOMO) give a better estimation of the project than COCOMO I? [[CO5](Understand/LOCQ)]
(b) For the given activity network, find the critical path and thus estimate the maximum time required to finish the project. Also draw the Gantt chart to complete the schedule.



[[CO6](Evaluate/HOCQ)]
3 + (2 + 1 + 6) = 12

9. (a) Write three limitations of LOC (Lines of Code) metric of project size estimation?
 (b) Assume that the size of an organic type software product has been estimated to be 32K lines of source code. Assume that the average salary of software engineers be Rs. 30,000/- per month. Determine the effort required to develop the software product, the nominal development time and cost required to develop the product. The constants for each category of software products are given below:

Project	a1	a2	b1	b2
Organic	2.4	1.05	2.5	0.38
Semi Detached	3.0	1.12	2.5	0.35
Embedded	3.6	1.20	2.5	0.32

- [[CO5](Evaluate/HOCQ)]
- (c) With examples compare and contrast between corrective and adaptive maintenance.

[[CO4](Analyze/IOCQ)]
3 + (2 + 2 + 1) + (2 + 2) = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	42.71	26.04	31.25