

SOFTWARE ENGINEERING
(MCA2101)

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) Coping with change is a crucial aspect of software development. Which software process model is most flexible in accommodating changes?
 - (a) Waterfall model
 - (b) Spiral model
 - (c) Agile model
 - (d) V-shaped model
- (ii) What is the main objective of the Rational Unified Process (RUP) in software development?
 - (a) To boost software sales
 - (b) To incorporate agile methodologies
 - (c) To offer a well-structured framework for managing software development
 - (d) To remove the necessity of documentation
- (iii) Which of the following best defines functional requirements in software engineering?
 - (a) Specifications that detail the expected behaviour and operations of the system
 - (b) Criteria specifying the visual design and layout of the user interface
 - (c) Conditions related to system efficiency, reliability, and performance
 - (d) Limitations and restrictions under which the system must operate
- (iv) Interaction models in system modelling represent:
 - (a) The flow of data within the system
 - (b) The sequence of events in a system
 - (c) The hierarchical structure of the system
 - (d) The performance characteristics of the system
- (v) What is the primary focus of architectural design in software development?
 - (a) Implementing individual features
 - (b) Defining the overall structure of the software system
 - (c) Writing code for specific functionalities
 - (d) Testing the software for bugs

- (vi) In software development, design patterns are known to:
 - (a) Provide detailed instructions for coding
 - (b) Deliver reusable solutions for frequently encountered design issues
 - (c) Emphasize visual representation of software elements
 - (d) Establish methodologies for project management
- (vii) What is the main responsibility of a product owner in the Scrum framework?
 - (a) Supervising the development team
 - (b) Prioritizing and maintaining the product backlog
 - (c) Writing and implementing code features
 - (d) Facilitating daily stand-up meetings
- (viii) Basis path testing is a white-box testing technique used to:
 - (a) Test boundary conditions of input variables
 - (b) Test internal data structures of the software
 - (c) Identify independent paths through the program's control flow graph
 - (d) Simulate real-world usage scenarios
- (ix) What does version control signify in the context of software configuration management?
 - (a) Overseeing and organizing multiple versions of the software
 - (b) Regulating access permissions to the software repository
 - (c) Keeping records of all modifications made to the software
 - (d) Monitoring and tracking software defects and issues
- (x) Software reliability can be enhanced by:
 - (a) Increasing code length
 - (b) Reducing cyclomatic complexity
 - (c) Minimizing stakeholder feedback
 - (d) Eliminating version control systems

Fill in the blanks with the correct word

- (xi) The ___ approach in software engineering combines agile and plan-driven methodologies.
- (xii) In architectural design, the decision-making process that determines the structure and behaviour of a software system is known as _____.
- (xiii) The method of software development that emphasizes adaptability and flexibility, with an iterative and incremental approach, is known as _____.
- (xiv) The process of managing and coordinating agile projects, often involving iterative planning and continuous feedback, is known as _____.
- (xv) _____ testing is performed by the end-users of the software in a real-world environment to identify any remaining issues before the final release.

Group - B

- 2. (a) Compare perspective and specialized process model. [[CO3] (Analyse/IOCQ)]

- (b) Analyze how the process framework activities of communication, planning, modelling, construction, and deployment contribute to the success of a software project. [[CO2] (Analyse/IOCQ)]
6 + 6 = 12
3. (a) Explain Software Product Development Life Cycle. [[CO2] (Understand/IOCQ)]
(b) Discuss how the Prototyping Model enhances user involvement and feedback in the software development process. [[CO3] (Analyse/IOCQ)]
4 + 8 = 12

Group - C

4. (a) Define Quality Function Development (QFD). [[CO6] (Remember/LOCQ)]
(b) Explain in detail about COCOMO model for software cost estimation. Use it to estimate the effort required to build software for a simple ATM that produces 12 screens, 10 reports and has 80 software components. Assume average complexity and average developer maturity. Use application composition model with object points. [[CO5] (Apply/IOCQ)]
3 + (5 + 4) = 12
5. (a) Compare and contrast collaboration diagrams and sequence diagrams in terms of their focus and use in modelling system behaviour. [[CO3] (Analyse/IOCQ)]
(b) Draw a collaboration diagram for an online order processing system, showing the interaction between the Customer, Order, Inventory, and Payment objects during the order placement process. [[CO3] (Apply/IOCQ)]
4 + 8 = 12

Group - D

6. (a) Explain the concept of monolithic architecture. [[CO3] (Understand/LOCQ)]
(b) Assess the implications of open-source development in terms of software quality, security, and licensing. [[CO3] (Analyse/IOCQ)]
3 + 9 = 12
7. (a) What is the main goal of the Dynamic Systems Development Method (DSDM) in agile project management? [[CO3] (Understand/LOCQ)]
(b) Draw and explain a class diagram for an online examination system with three core functionalities. [[CO3] (Apply/IOCQ)]
4 + 8 = 12

Group - E

8. (a) Briefly explain Control Structure Testing. [[CO4] (Understand/LOCQ)]
(b) A financial application processes loan requests based on two key inputs: the applicant's credit score (ranging from 300 to 850) and annual income (ranging from \$20,000 to \$200,000). The system grants loans only if the credit score is at least 650 and the annual income is at least \$50,000.

Using Boundary Value Analysis, generate a comprehensive set of test cases that consider the boundaries of both variables.

[(CO4) (Apply/IOCQ)]

3 + (2 + 7) = 12

9. (a) What are the primary objectives of Software Configuration Management (SCM)?

[(CO5) (Understand/LOCQ)]

(b) Explain McCall's Quality Factors and their relevance to software quality assurance.

[(CO6) (Analyse/IOCQ)]

4 + (5 + 3) = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	17.71	82.29	0