

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is not allowed

Q.No	Question	CO	Marks
Q1	Assessment-Based Questions - Explain the importance of Software Metrics in software project management. Differentiate between Size-Oriented Metrics and Function-Oriented Metrics with suitable examples. - Describe the role of Project Scheduling Techniques in Software Engineering. Compare CPM and PERT with suitable examples. - Explain the objectives and principles of Software Testing. Differentiate between Verification and Validation with examples.	CO1,3	3*2=6
Q2	Theory Questions - A software application was modified to add a new payment feature. Answer the following: - Why is Regression Testing required after modification? - Explain Mutation Testing with a suitable example. - What is Cyclomatic Complexity? Explain different methods to calculate it and discuss its significance in test case design. - Discuss the importance of Software Quality Assurance (SQA) in software engineering. Explain different quality attributes of software systems.	CO4,5	3*2=6

Q3	Numerical Questions a) Assume postal rates for 'light letters' are: ₹25 up to 10 grams, ₹35 up to 50 grams, ₹45 up to 75 grams, and ₹55 up to 100 grams. Design the various test cases using Boundary values analysis and robustness boundary value analysis techniques. Design suitable test cases Using: • Equivalence Partitioning • Robustness Boundary Value Analysis b) Given the following pseudo-code: 1. Start 2. Input A, B 3. If A > B 4. Print A 5. Else 6. Print B 7. EndIf 8. Stop Perform the following: 1. Draw the flow graph 2. Calculate Cyclomatic Complexity using all methods 3. Determine the number of independent paths c) A software project required development time of 15 months in semi-detached mode. Find size of the project (KLOC) and efforts.	CO4,5	3*3=9
Q4	Derivation-Based Questions a) Explain the derivation of Cause-Effect Graphing from Boolean logic expressions. Discuss how it helps in generating effective test cases. b) Derive the relationship between: • Defect Density • KLOC • Total Defects Explain how defect density is used for software quality assessment.	CO4,5	2*4=8
Q5	Critical-Thinking Questions A software development project is estimated to have a size of 45,000 lines of code (45 KLOC). Using the Intermediate COCOMO model, estimate the Effort, Development Time, Average Team Size, and Productivity for a Semi-Detached development mode, assuming that the Effort Adjustment Factor (EAF) is 1.2. Use the appropriate Intermediate COCOMO constants for the Semi-Detached mode. Further, using the same project size, apply the Basic COCOMO model for the Embedded development mode and calculate the Effort, Development Time, Average Team Size, and Productivity using the suitable Basic COCOMO constants for the Embedded mode. Finally, compare the results obtained for both development modes and determine in which mode a larger team size is required and which mode shows higher productivity.	CO5	6