

**BACHELOR OF INFORMATION TECHNOLOGY ENGG. EXAMINATION, 2025**2<sup>nd</sup> year, 2<sup>nd</sup> semester**Software Engineering**

Time: 3 Hours

Full Marks: 100

Read the questions carefully and answer them.

**CO1: Answer Q1 and any one from the rest.**

Full marks: 20

1. (a) You have to develop a software product for a very large steel company with multiple departments. They have a complex legacy system. Data migration from this legacy system is not an easy task and would take a considerable time. What process models will you choose? Justify your answer.  
(b) With a clear diagram explain that model of software development. (4+6)
2. (a) Mention any five principles of software engineering.  
(b) Which phase consumes maximum effort for developing a typical software product? Explain the reason.  
(c) Among all phases of software development, an undetected error from the design phase that ultimately gets detected during the system acceptance test, costs the maximum. Explain the reason. (4+3+3)
3. (a) With a clear diagram explain Incremental Development Model for software development. When we select Incremental model?  
(b) Differentiate between the waterfall model and the incremental model. (6+1+3)

**CO2: Answer any two questions**

Full marks: 20

4. (a) Why is the SRS document known as the black-box specification of a system? What do you understand by traceability of requirements?  
(b) What is a Feasibility Study? Why it is so important?  
(c) Explain about the various types of system modeling. (4+3+3)
5. (a) What are the relative disadvantages of using either the LOC or the function point metric to measure the size of the software?  
(b) If an organic project requires 160 person-months (PM) as its effort to complete the project, calculate the size and the development time for basic COCOMO. (5+5)
6. (a) Consider the following Temperature Monitoring System. This system senses temperature continuously and displays it in a LCD. It also takes input from a switch which tells it whether to display in the temperature in C or F. It also activates an alarm when the temp goes out of range.  
Find out the activities for the above project, assign suitable time in each activity and draw an Activity Network for the same. Find out the critical path?  
(b) Draw the Gantt chart representation of the project. ((4+2)+4)

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| <b>CO3: Answer any <u>one</u> questions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Full marks: 20</b> |
| <p>7. (a) What are the various types of Cohesion are there? Explain with examples.<br/> (b) "We cannot decompose a large problem into any smaller module infinitely." Explain your answer.<br/> (c) Draw a Use Case Diagram for the following system.<br/> A Library lends books and magazines to member, who is registered in the system. It also maintains the purchase of new books and magazines for the Library. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned or purchased by the library, that person is notified. The library can easily create, replace and delete information about the books, members, and reservation in the system. The books transactions are stored in the database. The fine list while the member returns the book after the due date must be generated.</p> <p style="text-align: right;"><b>(6+4+10)</b></p> <p>8. (a) Differentiate between structured analysis and structured design.<br/> (b) With one example explain the balancing a DFD.<br/> (c) What are the main shortcomings of Data Flow Diagram (DFD)?<br/> (d) Draw a Data Flow Diagram/ Class Diagram for the Library Management System described in question 7(c).</p> <p style="text-align: right;"><b>(3+4+3+10)</b></p>                                  |                       |
| <b>CO4: Answer any <u>two</u> questions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Full marks: 30</b> |
| <p>9. (a) Discuss with the help of appropriate examples:<br/> (i) Branch coverage criterion and (ii) Path coverage criterion<br/> (b) Which one of the following is the strongest structural test technique: Statement coverage-based testing, branch coverage-based testing, or condition coverage-based testing?<br/> (c) Discuss the difference between code inspection and code walk-through.</p> <p style="text-align: right;"><b>((4+4)+3+4)</b></p> <p>10. (a) Write a pseudo code for testing a grade calculation system that determines all scores from 90 to 100 as grade of A, 50 to 89 as P and less than 50 Fail. Find out the test cases for Equivalence Class Partitioning.<br/> (b) Find out the test cases for the boundary value analysis for the above system.<br/> (c) Draw the control flow graph for the above system and calculate "Cyclomatic Complexity".<br/> (d) What is symbolic debugger?</p> <p style="text-align: right;"><b>(3+3+(4+3)+2)</b></p> <p>11. (a) What do you understand by the term system testing? How it is different from Integration testing.<br/> (b) How regression and stress tests are performed.<br/> (c) Differentiate between the Alpha and Beta testing.<br/> (d) Differentiate between verification and validation.</p> <p style="text-align: right;"><b>(4+4+4+3)</b></p> |                       |
| <b>CO5: Answer the following question</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Full marks: 10</b> |
| <p>12. Write short notes on any <u>two</u>:</p> <p style="text-align: right;"><b>(5+5)</b></p> <p>(a) Software Quality Management.<br/> (b) People Capability Maturity Model.<br/> (c) Process based Quality Improvement Program.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |