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**Narula Institute of Technology**  
**An Autonomous Institute under MAKAUT**  
**2024**

**END SEMESTER EXAMINATION - EVEN 2024**  
**CS603 - SOFTWARE ENGINEERING**

**TIME ALLOTTED: 3Hours****FULL MARKS: 70**

*Instructions to the candidate:*

*Figures to the right indicate full marks.*

*Draw neat sketches and diagram wherever is necessary.*

*Candidates are required to give their answers in their own words as far as practicable*

**Group A**

**(Multiple Choice Type Questions)**

**Answer any ten from the following, choosing the correct alternative of each question: 10×1=10**

1.i) Which one is NOT a measure of size estimation for software product? (1) CO1 BL2

- a) Lines of code or KLOC
- b) Function point metric
- c) Halstead's program length
- d) Cyclomatic complexity

1.ii) The purpose of the coding phase (sometimes called the implementation phase) of software development is to translate the software design into..... (1) CO1 BL2

- a) Object Code
- b) Execution Code
- c) Source Code
- d) Compilation Code

1.iii) The term COCOMO stands for (1) CO1 BL3

- a) COmposite COst Model
- b) COnstructive COst Model
- c) COnstructive COmposite Model
- d) COmprehensive COnstruction MOdel

1.iv) Which of the following life cycle model can be chosen if the development team has less experience on similar projects? (1) CO1 BL3

- a) Iterative Enhancement Model
- b) Iterative Waterfall Model
- c) Spiral Model
- d) Prototyping Model

1.v) The context diagram is also known as (1) CO1 BL1

- a) Level-0 DFD
- b) Level-1 DFD

- c) Level-2 DFD
- d) Level-3 DFD

1.vi) Which type of the system testing performed by the customer himself after the product delivery to determine whether to accept or reject the delivered product. (1) CO1 BL4

- a)  $\alpha$  – testing
- b)  $\beta$  –testing
- c) Acceptance testing
- d) None of the above

1.vii) When elements of module are organized such that they are processed at a similar point in time, it is called (1) CO1 BL3

- a) Sequential cohesion
- b) Logical cohesion
- c) Temporal Cohesion
- d) Procedural cohesion

1.viii) Which of the following risk is the failure of connection in purchased mobile component to perform as expected? (1) CO1 BL2

- a) Business risk
- b) Technical risk
- c) Project risk
- d) Programming risk

1.ix) Activities and action taken on the data are represented by Circle or Round- edged rectangles. (1) CO1 BL1

- a) Entities
- b) Process
- c) Data Storage
- d) Data Flow

1.x) The UML supports event-based modeling using which of the following diagram (1) CO1 BL2

- a) Deployment diagram
- b) Collaboration diagram
- c) State chart diagram
- d) Class diagram

1.xi) Each function of the system can be considered as a transformation of a set of input data to the corresponding set of output data is known as (1) CO1 BL1

- a) Functional requirements
- b) Non Functional requirements
- c) Goals of implementation
- d) None of the above

1.xii) Given a control flow graph G of a program, the cyclomatic complexity  $V(G)$  can be computed as: (1) CO1 BL5

- a)  $V(G) = E - N + 2$
- b)  $V(G) = E - N - 2$

- c)  $V(G) = E + N - 2$   
 d)  $V(G) = E + N + 2$

**Group B**  
**(Short Answer Type Questions)**  
**(Answer any three of the following) 3x5=15**

- |   |     |     |     |
|---|-----|-----|-----|
| 2. What is Data Flow Diagram (DFD)? Briefly explain the level-0 and level-1 DFD of Library management System.   | (5) | CO1 | BL3 |
| 3. Explain the characteristics of a good software design?   | (5) | CO1 | BL2 |
| 4. Explain the different categories of customer requirements clearly specified in the SRS document.   | (5) | CO1 | BL3 |
| 5. What are the advantage and disadvantage of Spiral Model?   | (5) | CO1 | BL2 |
| 6. The size of a semi-detached type software system to be developed by ABC Consultancy Services has been estimated to be 32000 LOC. Assume that the average salary of software developer is Rs. 15000/- per month. Determine the effort required to develop the software product, the nominal time and cost to develop the product. | (5) | CO1 | BL4 |

**Group C**  
**(Long Answer Type Questions)**  
**(Answer any three of the following) 3x15=45**

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|---|------|-----|-----|
| 7a. Estimate the cost of software using a heuristic estimation technique (COCOMO) for different categories of software products.  | (7)  | CO1 | BL4 |
| 7b. Consider a software project with 5 activities T1 to T5. Duration of the 5 activities in weeks are 3,2,3,5,2 respectively. T2 and T4 can start when T1 is complete. T3 can start when T2 is complete. T5 can start when both T3 and T4 are complete. Draw the activity network diagram. When is the latest start date of the activity T3. Consider the above software project. | (8)  | CO1 | BL5 |
| a) Draw the Network diagram for given project.<br>b) Draw the GANTT chart for given project and find the critical path.   |      |     |     |
| 8a. Define the terms software reliability and software quality? How do you measure the software reliability and software quality?   | (10) | CO1 | BL4 |
| 8b. Differentiate between a data flow diagram (DFD) and Entity relationship diagram (ERD).  | (5)  | CO1 | BL2 |
| 9. Write a C function for searching an integer value from a large sorted sequence of integer values stored in an array of size 100, using binary search method.   | (15) | CO1 | BL4 |
| a) Build the control flow graph of your binary search function, and hence determine its cyclomatic complexity.<br>b) How is cyclomatic complexity metric useful in designing the test suite for path coverage?  |      |     |     |

c) Design a test suite for testing your binary search function.

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|--|-----|-----|-----|
| 10a. The size of an embedded type software project to be developed by XYZ- Consultancy Services has been estimated to be 42000 LOC. The average salary of employee is Rs. 50000/- per month. Determine the effort required to develop the software system. Find the cost and development time for the given project. | (5) | CO1 | BL5 |
| 10b. How do you measure the size of software using function point metrics?   | (5) | CO1 | BL4 |
| 10c. Explain the working principle of incremental model or evolutionary model.   | (5) | CO1 | BL2 |
| 11a. Explain the different levels of capability maturity model of software process.  | (6) | CO1 | BL2 |
| 11b. Explain the three essential activities of risk management that needed to plan by project manager.   | (9) | CO1 | BL3 |

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