



SCHOOL OF COMPUTER SCIENCE AND ENGINEERING
CONTINUOUS ASSESSMENT TEST - I
WINTER SEMESTER 2025-2026

Programme Name & Branch : B. Tech. Computer Science and Engineering
Course Code and Course Name : BCSE301L and Software Engineering
Faculty Name(s) : SWATHI J.N, MYTHILI T, AKILA VICTOR, ANTO S, PEREPI
RAJARAJESWARI, CHANDRU VIGNESH C, THANUJA R, ARCHANA T, PARTHIBAN K, PRIYANKA N, POORNIMA N,
JAFAR ALI IBRAHIM S, SIVAPRAKASH S, YOGANAND S, SUGANTHINI C, DIVYA MEENA S, DEVIPRIYA A,
SAURABH AGRAWAL.
Class Number(s) : VL2025260501368, 1369, 1391, 1397, 1401, 1409, 1413, 1419,
1421, 1423, 1425, 1429, 1430, 1463, 1487, 2260, 4701, 6742.
Date of Examination : 27-01-2026
Exam Duration : 90 minutes **Maximum Marks: 50**

Course Outcomes:

1. Apply and assess the principles of various process models for the software development. (CO1)
2. Demonstrate various software project management activities that include planning, Estimations, Risk assessment and Configuration Management (CO2)
3. Perform Requirements modelling and apply appropriate design and testing heuristics to produce quality software systems (CO3)

Q. No	Question	CO	BL	Marks
1.	Indian Gram Panchayat has planned to propose an open-source software named as E-Services. The main objective of this application is for better delivery of Citizen Services in the village through computerization. This larger system must be developed and delivered in phases. This application comprises of: (i) Online petition monitoring system: Petition Processing Portal (E – district GDP) is an integral part of the district administration and the related departments in their day – to – day office work. OPMS is the customized version of E – district GDP for accepting applications and has the facility to record the petitions of different types of applications such as: * Birth Certificate. * Death Certificate. * Community Certificate. * Pan Card. (ii) Online Patta transfer system: This service enables the Online Patta Transfer for land parcels with options like ISD [Including Sub – Divisions] and NISD [Not Including Sub – Divisions]. Status of each stage is intimated to the applicant via SMS and Patta Transfer order is generated in the system which is secured with 2D-Barcode. This proposed system provides transparency and integrity of data. These services enable people to track and view the status of the application services enables people to track and view the status of the application at Collectorate Counters, Common Service Centres, Anytime Anywhere Systems. These services can be viewed and updated by the staff of the Gram Panchayat. Question: Which SDLC model will be suitable to develop this application? Justify your answer and explain the model recommended.	CO 1	3	10
2.	A municipal corporation develops an IoT-enabled Smart Waste Management System under Smart Cities Mission. <i>Features include:</i> public bin locator, dynamic route optimization for 200 trucks, real-time fill-level sensors (500 bins), analytics dashboard. List down 12 agile principles and explain any six agile principles with specific implementation strategies for this waste management system to ensure timely delivery and high-quality software.	CO 1	3	10

3.	a) Techno Soft Ltd. is estimating software size for two development projects using Function Point analysis. Project A (online shopping app, average complexity): 15 <i>External Inputs</i>, 20 <i>External Outputs</i>, 18 <i>External inquires</i>, 8 <i>Internal Logical Files</i>, 5 <i>External Logical Files</i>. It is given that the complexity weighting factors are 4, 5, 4, 10, and 7, respectively. Project B (inventory system, simple complexity): 8 <i>External Inputs</i>, 12 <i>External Outputs</i>, 10 <i>External inquires</i>, 4 <i>Internal Logical Files</i>, 3 <i>External Logical Files</i>. It is given that the complexity weighting factors are 3, 4, 3, 7, and 5, respectively. There are 14 value adjustment factors influencing the system's development effort: Four factors are not applicable; Four factors have a value of 3 and the remaining Six factors have a value of 4. (i) Calculate UFP for both projects using appropriate complexity weights. Display in Table form (4marks) (ii) Compute FP for each and compare their relative sizes. (3 marks) b) Given a project to develop a Hospital Management System (HMS). Identify three potential milestones and their corresponding deliverables. (3 marks)	CO 2	3	10																																								
4.	A systems analyst is assigned to develop a project with the following activities and their respective optimistic (O), most likely (M), and pessimistic (P) time estimates. <table border="1"> <thead> <tr> <th>Activity</th> <th>Optimistic (t_o)</th> <th>Most likely (t_m)</th> <th>Pessimistic (t_p)</th> </tr> </thead> <tbody> <tr><td>1-2</td><td>3</td><td>6</td><td>9</td></tr> <tr><td>1-6</td><td>2</td><td>5</td><td>8</td></tr> <tr><td>2-3</td><td>6</td><td>12</td><td>18</td></tr> <tr><td>2-4</td><td>4</td><td>5</td><td>6</td></tr> <tr><td>3-5</td><td>8</td><td>11</td><td>14</td></tr> <tr><td>4-5</td><td>3</td><td>7</td><td>11</td></tr> <tr><td>6-7</td><td>3</td><td>4</td><td>6</td></tr> <tr><td>5-8</td><td>2</td><td>4</td><td>6</td></tr> <tr><td>7-8</td><td>8</td><td>16</td><td>18</td></tr> </tbody> </table> Calculate the following: i) Create a network diagram for the project and find the total duration of the project. (3 Marks) ii) Expected time (TE) for each activity using PERT Analysis. (2 marks) iii) Compute the critical path. (2 marks) iv) Calculation of Standard Deviation and Variance for the Critical Activities. (3 marks)	Activity	Optimistic (t _o)	Most likely (t _m)	Pessimistic (t _p)	1-2	3	6	9	1-6	2	5	8	2-3	6	12	18	2-4	4	5	6	3-5	8	11	14	4-5	3	7	11	6-7	3	4	6	5-8	2	4	6	7-8	8	16	18	CO 2	3	10
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5.	a) Tamil Nadu Electricity Board (TNEB) would like to automate its billing process. Customers apply for a connection(domestic/commercial) EB staff take readings and update the system. Each customer can choose to pay either by Cash/Card. A bill is generated on payment. Monthly reports are provided to EB Manager. Draw the Level-0, Level-1 DFD. (7 marks) b) Design a comprehensive ER Diagram for TNEB Billing System showing: i) Entities with primary attributes (underline Primary Key): Customer, Connection, Meter Reading, Bill, Payment, EB Staff, monthly Report. Relationships with cardinality and descriptive attributes. (3 Marks)	CO 3	3	10																																								