Draw the Activity network and the Gantt chart representations for the project. 8

(b) What are the relative advantages of using either the LOC or the function point metric to measure the size of a software product? 2

(c) List three common types of risks that a typical software project might suffer from. Explain how you can identify the risks that your project is susceptible to. 4

10. (a) Identify the factors which make the measurement of software reliability a much harder problem than the measurement of hardware reliability. 4

(b) Suppose you have been appointed as the project manager of a large project; identify the activities you would undertake to plan your project. Explain the sequence in which you would undertake these activities by using a flow chart notation. What are some of the factors which make it hard to accurately estimate the cost of software projects? 6

(c) Explain how you can choose the best risk reduction technique when there are many ways of reducing a risk. 4

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B.Tech Even Semester Examination, May, 2025

Computer Science & Engineering

(4th Semester)

Course No: CSE-251

(Software Engineering)

Full Marks: 70

Pass Marks: 28

Time: 3 hours

Note:

1. Attempt any one question from each unit
2. Begin each answer in a new page
3. Answer parts of a question at a place
4. Assume reasonable data wherever required
5. The figure in the right margin indicates full marks for the question
6. All the mathematical symbols and abbreviations have their usual meanings.

UNIT-I

1. (a) Write the IEEE definition of Software engineering. Also mention what is software crisis. 4

(b) Define Agile Process and explain agility principle. Why is there a shift in current market to agile models from conventional models. 4+2

(c) Based on the given scenario, which software development life cycle model would you recommend for this project, and why?

You are part of a startup team developing a mobile application for a ride-sharing service. The project has a tight timeline, and the team members have diverse skills and

expertise. The requirements are likely to evolve as the project progresses, and quick iterations are necessary for gathering user feedback. 4

2. (a) Briefly explain the definite stages through which a software product undergoes during its lifetime. What is the advantage of adhering to life cycle models for software development? 6+2

(b) What is Extreme Programming? Explain with a neat diagram. 4

(c) Define SCRUM, also mention what is a sprint in scrum? 2

UNIT-II

3. (a) Who are the different categories of users of the SRS document? What are their expectations from the SRS document? 4

(b) What are the characteristics of a bad SRS document. 3

(c) Draft an SRS for a Library Management System. 7

4. (a) What are the main shortcomings of Data Flow Diagram (DFD) as a tool for performing structured analysis? 3

(b) What are the problems with requirement gathering and analysis. 2

(c) Draw a labelled DFD for the following Restaurant Automation System. Clearly show the context diagram (Level 0 DFD) and its hierarchical decompositions up to Level 1. Also develop the structured design for the same. 2+3+4

the relative merits of code inspection and code walk through. 3+2

(b) What is stress testing? Why is stress testing applicable to only certain types of systems? 3

(c) What do you understand by the term system testing? What are the different kinds of system testing that are usually performed on large software products? 2+4

UNIT-V

9. (a) The following table indicates the various tasks involved in completing a software project, the corresponding activities, and the estimated effort for each task in person-months.

Notation	Activity	Effort (person-months)
T_1	Requirements specification	1
T_2	Design	2
T_3	Code actuator interface module	2
T_4	Code sensor interface module	5
T_5	Code user interface part	3
T_6	Code control processing part	1
T_7	Integrate and test	6
T_8	Write user manual	3

The precedence relation $T_i < \{T_j, T_k\}$ implies that the task T_i must complete before either task T_j or T_k can start. The following precedence relation is known to hold among different tasks: $T_1 < T_2 < \{T_3, T_4, T_5, T_6\} < T_7$.

Scenario: A restaurant owner seeks to computerize order processing, billing, and accounting. The system must generate sales reports for different items and improve supply ordering to minimize both excess inventory and ingredient shortages for popular dishes. It should maintain item prices and allow managers to update them. Sales clerks will enter the item code and quantity sold, and the system must generate bills accordingly. Ingredient issuance for food preparation must also be recorded. The system should automatically generate daily purchase orders when ingredient stock falls below a threshold, calculated based on the past three days' average consumption and ensuring at least two days' stock is maintained. Upon receipt of ordered ingredients, invoice details must be entered. If sufficient cash balance exists, the system should immediately print cheques against invoices. Monthly sales, receipts, and expense reports should be available upon the manager's request.

UNIT-III

5. (a) What do you mean by the terms cohesion and coupling in the context of software design? How are these concepts useful in arriving at a good design of a system? 5

   (b) Compare relative advantages of the object-oriented and function-oriented approaches to software design. 3

   (c) Explain some of the causes of and remedies for high coupling between two software modules. What problems are likely to arise if two modules have high coupling? 4+2

6. (a) Differentiate between structured analysis and structured design in the context of functionoriented design. 3

   (b) Write about the different levels of software design. 3

   (c) What is meant by the term cohesion in the context of software design? Is it true that in a good design, the modules should have low cohesion? Why? 3

   (d) Explain the different types of coupling. 5

UNIT-IV

7. (a) What is meant by a code walk through? What are some of the important types of errors checked during code walk throughs? 2+2

   (b) Design the black-box test suite for the following Library Automation Software. The Library Automation Software accepts a string representing the name of a book. It checks the library catalog, and displays whether the book is listed in the catalog or not. If the book is listed in the catalog, it displays the number of copies that are currently available in the racks and the copies issued out. 5

   (c) What is the difference between the top-down and the bottom-up integration testing approaches? Explain your answer using an example. Why is the mixed integration testing approach preferred by many testers? 5

8. (a) Briefly highlight the difference between code inspection and code walk through. Compare