

6. (a) Answer the following related to Risk Management :
(7)

(i) Describe three categories of Project Risk.

(ii) Write the steps to be taken to mitigate risk for reducing 'Staff Turnover'.

(b) What is the importance of SRS (Software Requirements Specification) document in software development? Describe any five characteristics of an SRS. (8)

7. (a) What is Capability Maturity Model Integration (CMMI)? Explain the various maturity layers of CMMI in detail. (7)

(b) Write short notes on the following with suitable examples : (8)

(i) Equivalence class partitioning.

(ii) Umbrella Activities.

(1500)

[This question paper contains 8 printed pages.]

Your Roll No.....

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Name of the Paper : Software Engineering

Name of the Course : **B.Sc. (H) Computer Science**

Semester : V

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. **Section A** is compulsory.
3. Attempt any **FOUR** questions from **Section B**.
4. Parts of a question should be attempted together.

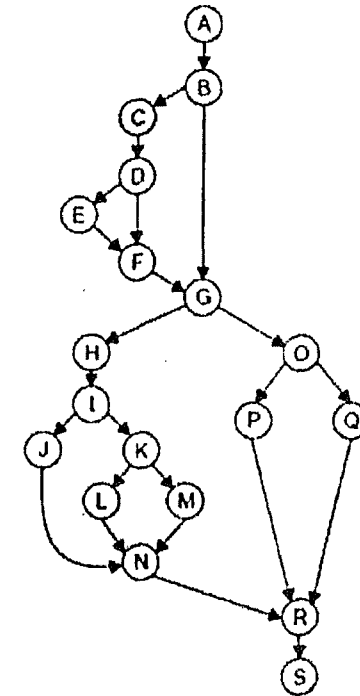
SECTION A

1. (a) Select the most appropriate software development process model for each scenario described below and justify your choice with relevant reasoning:

P.T.O. .

- (i) A project that involves research, experimentation, and high uncertainty, where the final system requirements and solution are not clearly understood at the beginning.
- (ii) A software product being developed in a startup environment, where rapid releases, continuous customer feedback, and maximum flexibility are critical for business survival. (3)
- (b) Describe any three development activities used in Scrum. (3)
- (c) Differentiate between functional and non-functional requirements. (3)
- (d) What are the characteristics of risk? Explain the reactive and proactive risk strategies to deal with software development risks. (3)
- (e) Define the following two measures of Software Product Quality : (3)
- (i) Reliability
 - (ii) Maintainability

- (b) Consider the flow graph given below. (8)



Answer the following:

- (i) Compute Cyclomatic Complexity using the three different methods.
- (ii) Write all the Independent paths.

$$5 \leq x \leq 50$$

$$10 \leq y \leq 100$$

Design the boundary value test cases for the program.

- (b) Compute the Function Point value for a project with the following information domain characteristics : (8)

Measurement Parameters	Count	Weighing Factors		
		Low	Average	High
Number of user inputs	18	3	4	6
Number of user outputs	12	4	5	7
Number of user inquirers	6	3	4	6
Number of internal files	6	7	10	15
Number of external interfaces	3	5	7	10

Assume the Count of the Measurement Parameters are equally divided among low, average and high complexity. Further, assume that the complexity adjustment value is 1.75.

5. (a) What is Cohesion? Explain any five types of Cohesion with the help of suitable examples. (7)

- (f) What is the purpose of Time Line Chart in project management? (3)
- (g) Assume that an organisation produces 450 LOC/PM with a burdened labour rate of \$5000/PM. Estimate the effort in Person-Month (PM) and cost in (\$) required to build the software having a total estimate of 70,000 LOC. (3)
- (h) A software increment is delivered to end-users by a software team. The users uncover 8 defects during the first month of use. Prior to delivery, the software team found 242 errors during formal technical reviews and all testing tasks. What is the overall DRE for the project? (3)
- (i) Illustrate any three process flows in software development with the help of diagram. (3)
- (j) Distinguish between Black-box and White-box testing techniques. (3)

SECTION B

2. (a) (i) What are Incremental Process Models? (7)
- (ii) Explain the Spiral Model with the help of suitable diagram.

(iii) Under which scenario is the spiral model more suitable for the development of software systems?

(b) Draw a labelled Context-Level and a Level-1 DFD for a store that sells paints and hardware products. The store receives supplies from multiple approved suppliers. Consider the following System Requirements :

(i) Customer Registration

- New customers provide their personal details to register with the store.
- The system stores the registration information in the Customer Database for future transactions.

(ii) Inventory Management

- The store maintains a Product Inventory Database containing details such as item name, item code, brand, price, quantity in stock, and supplier information.

(iii) Order Processing

- When a registered customer requests an item, the system checks inventory to confirm stock availability.

- If the item is available, the system records the order details (item code, quantity ordered, and unit price) in the Customer Database.

(iv) Billing

- Using the stored ordered-item details, the system generates and issues a Payment Receipt to the customer.

3. (a) Define Software Reliability? Discuss the three product quality factors introduced by McCall's Software Quality Model. (7)

(b) Explain the following elements of Software Quality Assurance. (8)

(i) Standards

(ii) Review and audit

(iii) Change Management

(iv) Vendor Management

4. (a) What is the significance of Boundary Value Analysis (BVA) in testing? Consider a program for computing the function $f(x, y)$ where the input variables x and y are in the range : (7)