

Software Engineering

Part-B: 20 marks भाग-ब: 20 अंक

Part B has 04 questions (with a limit of 150 words) of 10 marks from each unit. The candidate is required to attempt any 02 questions.

प्रश्न पत्र के भाग ब में 10 अंक के 04 प्रश्न (150-शब्दों की सीमा के साथ) हैं। परीक्षार्थी को कोई भी 02 प्रश्न हल करने हैं।

Part-C: 80 marks भाग-स: 80 अंक

Part C of the question paper is divided into four units comprising question numbers 6-9. There is one descriptive question from each unit with internal choice. Each question will carry 20 marks.

प्रश्न पत्र के भाग स को प्रश्न संख्या 6-9 सहित चार इकाइयों में विभाजित है। प्रत्येक इकाई से आंतरिक विकल्प के साथ एक वर्णनात्मक प्रश्न है। प्रत्येक प्रश्न 20 अंक का है।

Part-A

1. (a) Define software.

[2×10]

(b) What is software component?

(c) Write any two ways of Requirement Identification?

(d) COCOMO stands for-

(e) What is on size estimation?

(f) What do you mean by abstraction?

(g) Explain functional independence.

(h) What is Unit Testing?

(i) Define software safety.

(j) What is the longest phase in software development life cycle?

Part-B

2. Explain about the problem domain in software engineering [10]

3. Differentiate between Verification and Validation by taking an example. [10]

4. Explain the Test characteristics in software engineering. [10]

5. What do you understand by Reverse Engineering? Explain [10]

Part-C

6. Explain waterfall model by taking suitable example. [20]

OR

Describe the concept of 'Prototyping' in software engineering. [20]

7. Describe the Uncertainties in cost estimation during software project planning. [20]

OR

Explain project scheduling & milestones with a suitable example. [20]

8. Discuss the Architectural design elements in the design model. [20]

OR

Differentiate between Black-Box Testing and while Box Testing with proper example. [20]

9. Explain (i) Risk management [20]

(ii) Measures of reliability & Availability

OR

Explain (i) Software Maintainance [20]

(ii) Re-engineering

Object Oriented Programming through C++

Part-A

Write short answer to the following:

[2×10=20]

- (a) What is OOP paradigm?
- (b) What do you mean by overloading?
- (c) What is the role of new and delete operator?
- (d) What are the Member and Non-member Functions?
- (e) Which operators cannot be overloaded?
- (f) What is this pointer?
- (g) What is member access control?
- (h) What is base and derived class?
- (i) What is Generic Programming?
- (j) What is Function Template?

Part-B

2. What is OOP and what are the essential concepts of Object-Oriented Programming (OOP)? Explain each.

[3+12]

OR

- (a) Differentiate between the functional programming and OOP approach. [08]
- (b) What are the advantages of OOP? [07]

3. (a) What is structure? What is the difference between class and structure? [2+5]
- (b) Explain the concept of constructors and destructors in C++ with examples. [08]

OR

- (a) What is a friend function? What are the merits and demerits of using friend functions? [2+6]
- (b) Write a program in C++ calculate factorial value using friend function. [07]

4. (a) What is operator overloading in C++? Demonstrate with an example how to overload the "+" operator. [4+6]
- (b) What are the difference between early and late binding? [05]

OR

Write short note on:

- (a) Importance of Inheritance [05]
- (b) Multiple and Multi Level inheritance [05]
- (c) Copy Constructor [05]

5. Explain the concept of templates in C++. How are function templates and class templates defined and used? Provide detailed examples for each. [5+10]

OR

What is Exception and how many types? Explain the Exception handling mechanism in C++? Explain with suitable example. [5+10]

Data Structures and Algorithms

Part-A

1. (a) List the characteristics of an algorithm. [2×10=20]
- (b) What do you mean by stack overflow and stack underflow?
- (c) Distinguish between Prefix and Postfix Expressions.
- (d) Explain binary tree.
- (e) Define the following terms in tree
- (i) Sibling
- (ii) Terminal Node
- (f) What do you mean by edges of a graph?
- (g) Define the terms Out-degree and In-degree applicable to a graph.
- (h) What do you know by Successor and Predecessor node in Directed Graph?
- (i) What do you know by Weighted Graph?
- (j) Differentiate between linear and binary search.

Part-B

2. Explain algorithm analysis in term of its complexity related to space, time and cases with suitable diagram. [15]

OR

Write an algorithm to insert values in a circular queue using an array with suitable example. [15]

3. Write an algorithm to delete a leaf node from a binary search tree. [15]

OR

Write an algorithm to insert a node into an ordered linked list. [15]

4. Write an algorithm for Depth First Search DFS(v) and Breadth First Search BFS(v) in a graph applications. [15]

OR

Write short note on:

(a) Adjacency matrix [8+7]

(b) Adjacent list

5. Explain the following: [10+5]

(a) Hash Function

(b) Selection Sort

OR

Define heap sort method and its advantages. How does the Heap Sort Method work? Explain with suitable example. [8+7]
