



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

SUMMER-2024	
Exam Seat No.:	
Academic Year:2023-2024	Semester:IV
Class:SY	Program:B.Tech
Branch Code:ADS/COM/CSD	Pattern:2022
Name of Course:Advanced Data Structures	Course Code:COM222012
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Question No. 1 Attempt following Question

- 1a) Explain the following : (6) Co1, CO5
- (i) Compare Kruskal's and Prims algorithm for minimum spanning tree (MST).(3 marks)
- (ii) Graph as an ADT (3 marks)

Question No. 2 Attempt following Question

- 2a) Construct binary search tree for data 52, 35, 12, 18, 20, 23, 52,55,32,90,19,26. Write and explain Binary Search Tree search algorithms. (6) Co1

Question No. 3 Attempt following Question

- 3a) Write and explain the algorithm to insert node into AVL tree. (8) CO2

OR

- 3b) Construct AVL tree also show different stages during the building of AVL tree for the following sequence of keys:30,31,32,23,22,28,24,29,26,27,34,36. In each case show the balance factor of all the nodes and name the type of rotation used for balancing (8) CO2

- 3c) What is the symbol table ? Which are the different representation of symbol table? list and explain in short different operations performed on any one example of symbol table also design an ADT for it. (8) CO2, CO5

OR

- 3d) Explain the following concepts related to Red-Black Trees: (8) CO2, CO5
- i. Describe the properties of a Red-Black Tree.

- ii. Explain the operations for maintaining the Red-Black Tree properties during insertion and deletion.
- iii. Discuss the time complexity of key operations (insertion, deletion, and search) in a Red-Black Tree.
- iv. Provide a comparison between Red-Black Trees and AVL Trees, highlighting their similarities and differences.

Question No. 4 Attempt following Question

- 4a) What is hashing? What is a hashing function? Give at least two examples of a hashing function. Discuss about the characteristics of a good hashing function. How is synonym resolution done during hashing (8) CO3

OR

- 4b) What is bucket hashing ? Explain with example. (8) CO3

- 4c) Using the modulo-division method and linear probing, store the following keys in hash table of size 19 records. How many collisions occurred? What is the density of the list after all the keys (8) CO3

have been inserted?

224562, 137456, 214562, 140145, 214575, 162145, 144467, 199645, 234534

OR

- 4d) Write a C++ program to perform create, insert, display and search operations for sequential file organization. (8) CO3

Question No. 5 Attempt following Question

- 5a) Explain in brief MAX heap and MIN heap. Draw MAX heap for given list of elements {40, 80, 35, 90, 45, 50, 70}. (8) CO4

OR

- 5b) State the need of B+ tree. Construct a B+ tree of order 5 for the following data :30, 31, 23, 32, 22, 28, 24, 29, 15, 26, 27, 34, 39, 36. (8) CO4

- 5c) With the help of example explain Heap as a Priority Queue (8) CO4

OR

- 5d) What is B tree ? Explain the process for deleting a particular value from B tree with the examples. (8) CO4

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