

15/05/19

Roll No.

--	--	--	--	--	--	--	--	--	--

B.E / B.Tech (FT / ~~BT~~) END SEMESTER EXAMINATIONS – APRIL / MAY 2019

CSE / COMPUTER TECHNOLOGY

III Semester

CS8302 Data Structures

(Regulation 2012)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART – A (10 x 2 = 20 Marks)

1. Convert the following expression from infix to postfix notation: $A/B-C*(D/E*(A-F)+B/G)$.
2. Define Big-o and Big-omega notation with suitable example.
3. Define graph and list any three application areas of graph.
4. State the properties of a binary tree.
5. Why it is said that searching a node in a binary search tree is efficient than that of a simple binary tree?
6. Define AVL Tree.
7. What do you mean by structure property in a heap?
8. Explain hashing with example.
9. What do you mean by internal and external sorting?
10. What is open addressing in Hash?



Part – B (5 x 16 = 80 marks)
(Question No.11 is Compulsory)

11. Construct a binary search tree whose post-order traversal is as follows: 5, 4, 9, 11, 12, 8, 13, and 7 (8)
Can a binary tree be uniquely re-constructed given its pre-order and post-order traversals? Justify your answer. (8)
 12. a) i) Suppose you are given a 2-D array $C[r,c]$, the base address is base $[C]$, the size of each element is w , the lower limit of the row subscript is lbr and the lower limit of column is lbc . Find the address of the element $C[k1,k2]$, if the array is stored in (1) row major form and (2) column major form. (10)
ii) What is meant by the stack overflow condition? Is it applicable to the linked list method of implementation of the stack? Give explanation. (6)
- (OR)
- b) i) Suppose you are given two polynomials. Represent the polynomial in a suitable data structure and write a C function to add two polynomials. (8)
 - ii) What are the advantages of circular link list over linear list? Write a function which will concatenate two lists using a circular list. (8)

13. a) i) Insert the following keys into a B-tree of order 3 and draw the final tree: (8)
10, 24, 23, 11, 31, 16, 26, 35, 29, 20, 46, 28, 13, 27, 33, and 21.
- ii) Write a recursive function to perform binary search on n data elements for a given key k. what are the best and worst case time complexity? (8)
- (OR)
- b) What is hashing? Give the characteristics of hash function and name different hash functions with a brief description and analysis. (16)
14. a) Write the merge sort algorithm and explain the working of merge sort on the following data: 10, 15, 1, 17, 20, 25, 30, 16, 70, and 6. show all the intermediate steps. Also, mention its time complexity. (16)
- (OR)
- b) Write the quick sort algorithm and show how following data set can be sorted by quick sort. Show each step in sorting. 78, 23, 31, 88, 43, 55, 67, 55. Also write down the properties of heap sort. (16)
15. a) i) Show the result of inserting 2, 1, 4, 5, 9, 3, 6, and 7 into an initially empty AVL tree. Specify the type of rotation after each iteration. (8)
- ii) What do you mean by graph traversal? Define DFS of a graph. Write an algorithm of non-recursive depth first traversal. (8)
- (OR)
- b) i) What property of red-black tree is most significant in explaining their worst case behavior for the operations find, insert and remove? (12)
- ii) How are graphs represented in memory of a computer? Give relative merits and demerits of these representation schemes. (4)

