

Hall Ticket Number:

Code No. : 12026 AS N/O (D)

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (IT: CBCS) II-Semester Advanced Supplementary Examinations, July-2019

Data Structures

Time: 3 hours

Max. Marks: 60

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. Write an algorithm for reversing a given integer, and compute its time complexity.
2. `int b[]={10,20,30,40};` Given this declaration, evaluate i) `*b+2` ii) `*(b+2)`
3. Define the stack ADT.
4. Convert the following infix expression into postfix notation: $(A+B)*C-D/E$ using operator stack
5. Write a C function to count the number of nodes in a singly linked list.
6. What is the advantage of using Linked List over an array for implementing a queue?
7. List the applications of Circular linked list.
8. Given a doubly linked list, show how a given node which is pointed to by 'p' can be deleted. Show all the relevant pointer rearrangements.
9. Show the working of binary search technique with an example.
10. Mention the worst, best and average time complexity of quicksort.

Part-B (5 × 8 = 40 Marks)

11. a) Bring out differences between static and dynamic memory allocation in C. [3]
b) Explain the importance of efficient algorithms and the significance of asymptotic analysis in this regard. [5]
12. a) Write a full implementation of stack using arrays. [4]
b) Write a C function to evaluate a given postfix expression. You can use the above stack implementation for this purpose. [4]
13. a) Write code for the push () operation on a linked stack. [3]
b) Write C code for deleting a node: i) at the beginning ii) at the end of a linked list. [5]
14. a) Define the node structure for representing a sparse matrix using a Linked List. [2]
b) Write a function for implementing addition sparse matrices using Singly Linked List. [6]
15. a) Explain how radix sort works with an example. [3]
b) Sort the following data using merge sort: 70, 25,79,81,12,100,50,45,95. [5]
16. a) Compare various linear data structures with respect to data insertion and deletion. [2]
b) Array implementation of Circular queue overcomes certain disadvantages of a linear queue. Give an argument in favor of circular queues. [6]
17. Answer any *two* of the following:
a) Write an algorithm for implementing a Queue using multiple instances of a stack. [4]
b) Write a C function to insert a new node at a given position 'p' in a doubly linked list. [4]
Define an appropriate node structure.
c) Explain how insertion sort works with an example. [4]
