Total No. of Questions – [08] Total No. of Printed Pages:03

G.R. No.	

Paper Code - U218-124 (CBE-FS)

MAY, 2019/ENDSEM

S. Y. B. TECH. (COMPUTER ENGINEERING) (SEMESTER - I)

COURSE NAME: FUNDAMENTALS OF DATA STRUCTURE

COURSE CODE: CSUA21174

(PATTERN 2017)

Time: [**2 Hours**] [Max. Marks: **50**]

(*) Instructions to candidates:

1) **Answer Q.1, Q.2, Q.3, Q.4, Q.5 OR Q.6, Q.7 OR Q.8**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data whereever required**

Q.1) a) a) Explain static and dynamic data structure with suitable example. [6 Marks]

OR

b) Given the following declaration: int x=10, y=10; int *p1=&x, *p2=&y; What is the value of the following expressions? 1)(*p1)++ 2) --(*p2) 3) *p1+(*p2)-- 4) ++(*p2)-*p1 5) *p1+*p2 6) --(*p1)+*p2 [6 marks]

Q.2) a) Write a code for fast transpose of a sparse matrix and analyze the same for its complexity. Write example. [6 marks]

OR

b) Write a pseudo C++ routine using pointers for 1.) Finding length of a given string and 2) Finding reverse of a given string. [6 marks]

Q.3) a). Explain the different types of linked lists with one example of each. [6 marks]

OR

b) Bank customer details are stored in Singly linked list. Draw node structure for given Singly Linked List. Write an algorithm to search a particular customer details. [6 marks]

Q.4) a) Explain concept of stack with stack overflow and underflow conditions. [4 marks]

OR

b) Write the algorithm to evaluate postfix expression. Give example. [4 marks]

Q. 5) a) Explain the need for circular queue over linear queue? Write pseudo C++ code to implement circular queue. [6 marks]

b) Explain: How Priority Queue helps in bandwidth management? [4 marks]

c) List any four applications of Queue and explain any one in detail. [4 marks]

OR

Q.6) a) A linear queue using array has a size of 3.Perform the following operations on this queue and show the sequence of steps with necessary diagrams indicating values of front, rear and contents of queue :

i. insert 20
ii. insert 30
iii. insert 40
iv. delete an element
v. insert 50
vi. delete an element
vii. delete an element
viii. insert 60 [6 marks]

b) When a queue is implemented using array, if rear becomes maximum size of the queue, we cannot insert element even when is space available. Suggest a solution to this problem. Justify your answer. [4 marks]

c) Explain the concept of Multi-queues with suitable example [4 marks]

Q.7) a) Write pseudo C++ code for selection sort. Compare selection and bubble sort. [6 marks]

b) Explain binary search with suitable example. [4 marks]

c) Sort the following data using quick sort in ascending order.
10, 5, 0, 16, 8, 20, 40,-6 What is average and worst case time complexity of quick sort. [4 marks]

OR

Q.8) a) Compare quick sort and merge sort. Comment on their complexity. [6 marks]

b) Show output of each pass using bubble sort to arrange the following nos in ascending order. 10, 9, 8, 7, 6, 5, 4, 3, 2, 1. [4 marks]

c) Explain linear search with a proper example. Discuss its complexity. [4 marks]