Total No. of Questions – [ ] Total No. of Printed Pages 02

U218-144 (T2)

G.R. No.	

OCTOBER 2018/ IN-SEM (T2)

S. Y. B. TECH. (I. T.), (SEMESTER - I)

COURSE NAME: FUNDAMENTALS OF DATA STRUCTURES

COURSE CODE: ITUA21174

(PATTERN 2017)

Time: [**1 Hour**] [Max. Marks: **30**]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2 and Q.3 OR Q.4.**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed.**
4) **Write suitable examples wherever necessary.**
5) **Draw suitable diagrams if required.**

Q.1) a) Write pseudo C code of merge sort. Find its time complexity. [6 marks]

b) Explain linear and binary search techniques with examples. [6 marks]

c) Explain importance of searching and sorting techniques in computer science. What is sort stability? [4 marks]

OR

Q.2) a) Sort the following data in ascending order using quick sort. Show all passes: 10,8,-9,12,1,-5,7,20,11,15. Write average and worst case time complexity of quick sort. [6 marks]

b) Explain the comparisons done by binary search algorithm in order to search 28 and 80 in the given input. (Arrange the input as required) 40, 21, 80, 54, 2, 11, 55, 95, 32, 12, 9, 15, 66, 58, 30 [6 marks]

c) Compare the selection sort and insertion sort techniques. [4 marks]

Q.3) a) Explain the sparse matrix representation. Write simple transpose algorithm. What is its time complexity? [6 marks]

b) Write Abstract Data Types for Polynomial. [4 marks]

c) What is row-major representation of a matrix? Let A be a two dimensional array declared as int A[5][6].Assume that each integer takes two memory locations. The first element of the array is stored at location 1000. Find the address of the element A[2][4] for row major and column major representation. [4 marks]

OR

Q.4) a) What is an ordered list? Give examples of ordered list. Represent following polynomials using array: [6 marks]

a. -11 x^9 + 3 x^5 + 7 x^2 - 9

b. -3x^5 y^7+7 y^3 -2

b) Write pseudo C routine to merge two sorted arrays. Give example. [4 marks]

c) Write a C function to convert a conventional matrix to sparse matrix. [4 marks]