Total No. of Questions—**12**] [Total No. of Printed Pages—**4**

Seat No.	

[4957]-204

S.E. (Computer) (I Sem.) EXAMINATION, 2016

DATA STRUCTURES AND ALGORITHM

(2008 PATTERN)

Time : Three Hours **Maximum Marks : 100**

N.B. **:—** (*i*) Answer *three* questions from Section I and *three* questions from Section II.

(*ii*) Answers to the two Sections should be written in separate answer-books.

(*iii*) Figures to the right indicate full marks.

(*iv*) Assume suitable data, if necessary.

SECTION I

1. (*a*) Write and explain any *five* string functions. [10]

(*b*) Write a function to swap the data of two variables without using third variable. [6]

Or

2. (*a*) Write a recursive function in "C" to find the factorial of given number. [6]

(*b*) Explain with example fread, fwrite, ftell and fseek functions for file handling in "C". [10]

P.T.O.

3. (*a*) What is the frequency count of the following : [6]

```
int avg (int n)
{     for(i=0; i<n, i++)
      sum = sum +i;
      sum/n;
}
```

Find out the time complexity.

(*b*) Write 'C' function to perform the matrix multiplication. What is the time complexity. [6]

(*c*) State the following statement is true or false. Justify your answer : [4]

(1) $6n + 5 = O(n^2)$

(2) $3n^2 + 4n + 9 = O(n)$.

Or

4. (*a*) What is row major and column major representation of matrix. Explain with example. [6]

(*b*) Write an ADT for array. [6]

(*c*) Explain any *two* asymptotic notations. [4]

5. (*a*) Write an ADT for sparse matrix. Explain function for sparse matrix addition. [8]

(*b*) Explain multidimensional arrays in 'C'. Give suitable example. [6]

(*c*) Find the address of a[10][5]th element if array starts from 1000 location and array declared as int a[15][15]. [4]

Or

6. (*a*) Write an ADT for polynomial. Write and explain function for polynomial nultiplication. [12]

(*b*) What is sparse matrix ? What are the advantages of sparse matrix over simple matrix. [6]

SECTION II

7. (*a*) Sort the following numbers step by step using Quick Sort Method : [10]

15, 10, 25, 8, 7, 2, 28, 21, 19, 09

(*b*) Explain different searching methods. Write space and time complexity of each. [6]

Or

8. (*a*) Write and explain function for merge sort. State its time and space complexity. [10]

(*b*) Apply Binary search on following data to search 29, 14, 02. Write how many comparisons need to search these items : [6]

02, 05, 06, 08, 14, 15, 20, 21, 28, 29.

9. (*a*) What is GLL ? Explain the node structure and ADT. [8]

(*b*) What are teh advantages of circular linked list over linear linked list. [8]

Or

10. (*a*) Show Graphical representation for the following GLL : [10]

(1, (2, 3, (4), 5, 6, 7), (8))

(*b*) Write node structure to represent polynomial with GLL. [6]

11. (*a*) Convert the following infix expression to postfix expression : [10]

(a +b) ^ e * d – f/n

(*b*) Write and explain applications of priority queue. [8]

Or

12. Write short note on : [18]

(1) Applications of stack

(2) Josephus problem and its 'C' function.