Total No. of Questions—**8**] [Total No. of Printed Pages—**3**

Seat No.	

[4857]-1084

S.E. (I.T.) (First Semester) EXAMINATION, 2015

FUNDAMENTALS OF DATA STRUCTURES

(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Answer Q. No. **1** *or* Q. No. **2**, Q. No. **3** *or* Q. No. **4**, Q. No. **5** *or* Q. No. **6**, Q. No. **7** *or* Q. No. **8**.

(*ii*) Neat diagrams must be drawn wherever necessary.

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

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

1. (*a*) What is the purpose of structure in 'C' ? Can we define the structure into the structure ? Give suitable example. [6]

(*b*) Write a pseudo code to find out length of string without using library function. [4]

(*c*) Explain pointer variable with example. [2]

Or

2. (*a*) Given the following declarations :

int m = 50, n = 50;

int $*p_1$ = & m, $*p_2$ = & n;

What is the value of each of the following expressions ? [4]

(*i*) (*p1)++ ;

(*ii*) – – (*p2);

(*iii*) *p1+ (*p2) – –;

(*iv*) ++(*p2) – *p1;

P.T.O.

(*b*) Explain how an array is passed to a function as a pointer with example. [4]

(*c*) Explain any *four* file operations. [4]

3. (*a*) What is time complexity of an algorithm ? Explain its importance with suitable example. [3]

(*b*) Explain linear and non-linear data structures with suitable examples. [3]

(*c*) Show the output of each pass using insertion sort to arrange the following numbers in ascending order : [6]

150, 350, 100, 250, 200, 50, 300.

Or

4. (*a*) Explain the importance of searching and sorting techniques in computer science field. What is sort stability ? [4]

(*b*) With respect to algorithm analysis, explain the following terms : [6]

(*i*) Big Oh notation

(*ii*) Omega notation

(*iii*) Theta notation

(*c*) What is the importance of pivot element in the quick sort method. [2]

5. (*a*) What is sparse matrix ? What are its applications ? [5]

(*b*) Explain row major and column major representation of arrays. [4]

(*c*) Represent the following polynomials using arrays : [4]

(*i*) $5x \text{ ^ } 2 - 10xy + y \text{ ^ } 2 - 20$

(*ii*) $x\text{^ } 4 + 59x + 10$

Or

6. (*a*) What is sequential memory organization ? List the advantages and disadvantages of sequential memory organization. [5]

(*b*) Write a pseudo code for the following stack operations : [4]

(*i*) push operation

(*ii*) pop operation

(*c*) Explain the address calculation of element in arrays in row major and column major Representation. [4]

7. (*a*) Compare linked list with arrays with reference to the following aspects : [6]

(*i*) Accessing any element randomly

(*ii*) Insertion and deletion of an element

(*iii*) Utilization of computer memory

(*b*) Write a pseudo code to delete a node from singly linked list. [7]

Or

8. (*a*) Explain GLL. Represent the following polynomial using GLL. [6]

$(p, q, (r, s,(t, u, v), w), x, u)$.

(*b*) Write a pseudo code to insert a node at start and at end in DLL. [7]