Total No. of Questions—12]

Seat	
No.	

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S.E. (Information Technology) (Second Semester) **EXAMINATION, 2015** DATA STRUCTURES AND FILES

(2008 PATTERN)

Time : Three Hours

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N.B. :- (i)Answer question Nos. 1 or 2, 3 or 4 and 5 or 6 from Section I and question Nos. 7 or 8, 9 or 10 and 11 or 12 from Section II.

- Answers to the two sections should be written in separate (ii) answer-books.
- Neat diagrams must be drawn wherever necessary. (iii)
- (iv)Assume suitable data if necessary.

SECTION I

1. (<i>a</i>)	Explain various file opening modes with respect to text and
	binary files. [6]
<i>(b)</i>	Explain the features of a sequential file. Write a 'C' program
	to copy contents of one file to another file using command
	line arguments. [6]
(c)	Write an algorithm for linear probing without replacement
	strategy. [6]
	P.T.O.

Maximum Marks : 100

- (a) State advantages and disadvantages of sequential file and index sequential file.
 - (b) Explain the features of a direct file. Write a 'C' program to find the sum of the numbers passed as command line arguments.
 - (c) What are the characteristics of good hash function ? How can collision be resolved in a hash table.
- 3. (a) What is stack ? Write an algorithm to implement stack using linked list. [8]
 - (b) Transform each of the following infix expression to postfix form using stack. Show clearly the contents of stack : [8]
 (i) D B + C
 (ii) A * B + C * D
 - (iii) (A + B) * C D * F + C
 - (iv) (A C) * (B + C D * E) * F).

Or

(a) Define implicit and explicit stack. What is the importance of stack in recursion ? Explain with suitable example. [8]

(b) Clearly indicate the contents of stack for evaluating the following postfix expressions. [8]
 Assume :

A = 8, B = 6, C = 10, D = 5, E = 7 AB - CD/* E +.

- 5. (a) What are the disadvantages of linear queue. Write a 'C' program to implement linear queue using linked organization. [8]
 - (b) Write a pseudo C code for implementation of circular queue using array.[8]

Or

- 6. (a) Write a 'C' program to implement deque using linked organization. [8]
 - (b) Write a pseudo C code for implementation of priority queue. [8]

SECTION II

- 7. (a) Define the following with respect to trees with examples : [8]
 - (i) Complete binary tree
 - (ii) Predecessor and successor
 - (*iii*) Height of tree
 - (iv) Skewed binary tree.
 - (b) Write functions for non-recursive inorder and preorder traversals for binary trees. [8]

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P.T.O.

- 8. (a) Construct a binary tree from the given traversals : [8] Preorder : * + a - bc/-de - + f g hInorder : a + b - c * d - e/f + g - h.
 - (b) Write non-recursive preorder traversal algorithm for inorder threaded binary tree. [8]
- **9.** (a) Write an algorithm to perform DFS traversal for a graph. Perform the same for the given graph (Refer Fig. 1) : [8]





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(b) Define the following with respect to graph with examples : [8]

- (i) Degree of node
- (ii) Isolated node
- (iii) Path
- (*iv*) Cycle.

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10. (a) For the graph given below find minimum spanning tree using Prim's algorithm. Show stepwise representation (Refer Fig. 2) : [8]





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(b) Define a graph. For the given adjacency matrix draw the graph and its adjacency list : [8]

	A	В	С	D	E	F	G	H
A	0	1	1	0	0	0	0	0
В	1	0	0	0	1	0	0	0

С	1	0	0	1	0	1	0	0	
D	0	0	1	0	0	0	0	1	
E	0	1	0	0	0	0	1	0	_
F	0	0	1	0	0	0	1	1	
G	0	0	0	1	0	1	0	0	
н	0	0	0	1	0	1	0	0	

11. (a) Define AVL tree. For the given data, build an AVL tree and show the balance factor and type of rotation at each step.

 $64, \ 1, \ 44, \ 26, \ 13, \ 110, \ 98, \ 85.$

(b) For the data given below build a Huffman tree and find code of each symbol : [8]

Character Weight		Weight	Character	Weight	
10	I	4	R	7	
3	к	2	S	5	
D 4		3	Т	12	
E 15		6	U	5	
2	0	8			
	Weight 10 3 4 15 2	WeightCharacter10I3K4M15N2O	WeightCharacterWeight10I43K24M315N62O8	WeightCharacterWeightCharacter10I4R3K2S4M3T15N6U2O8I	

12. (a) Sort the following numbers in ascending order using heap sort.Show the sorting stepwise : [10]

 $77, \ 62, \ 14, \ 9, \ 30, \ 21, \ 80, \ 25, \ 70, \ 55.$

(b) Distingusih between Huffman's tree, OBST and AVl in terms of their definition and application. [8]

Or