Total No. of Questions—**12**] [Total No. of Printed Pages—**7**

Seat No.	

[4757]-196

S.E. (Information Technology) (Second Semester)

EXAMINATION, 2015

DATA STRUCTURES AND FILES

(2008 PATTERN)

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

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.

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

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

(*iv*) Assume suitable data if necessary.

SECTION I

1. (*a*) Explain various file opening modes with respect to text and binary files. [6]

(*b*) 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.

Or

2. (*a*) State advantages and disadvantages of sequential file and index sequential file. [6]

(*b*) Explain the features of a direct file. Write a 'C' program to find the sum of the numbers passed as command line arguments. [6]

(*c*) What are the characteristics of good hash function ? How can collision be resolved in a hash table. [6]

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

4. (*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]

Or

8. (*a*) Construct a binary tree from the given traversals : [8]

Preorder : * + a – bc/–de – + f g h

Inorder : 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]

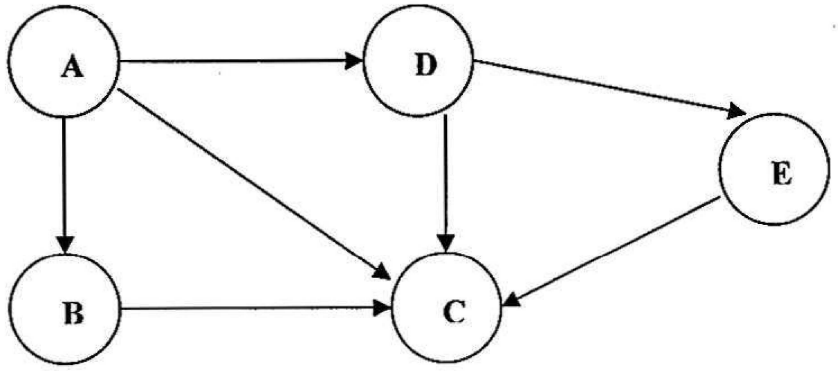

Fig. 1

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

(*i*) Degree of node

(*ii*) Isolated node

(*iii*) Path

(*iv*) Cycle.

Or

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

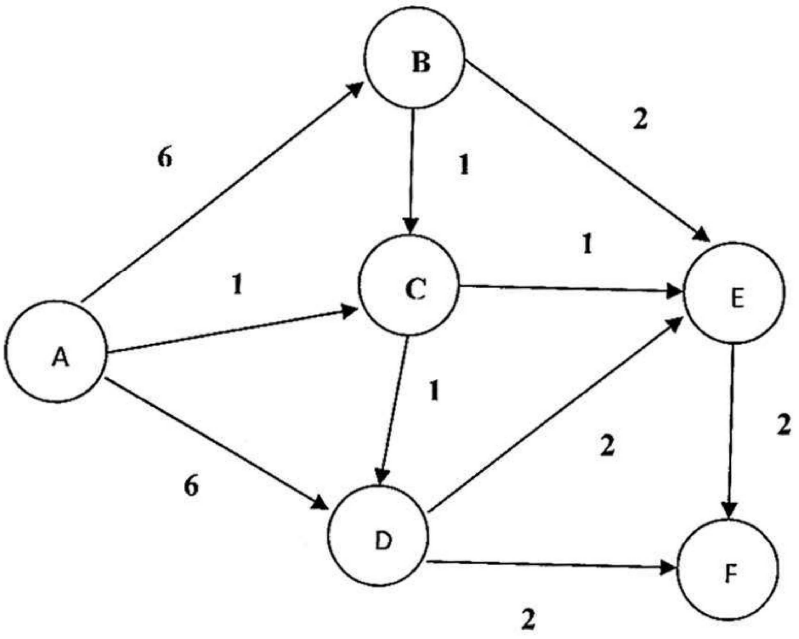

Fig. 2

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

	A	B	C	D	E	F	G	H
A	0	1	1	0	0	0	0	0
B	1	0	0	0	1	0	0	0

C	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
H	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. [10]

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	Character	Weight	Character	Weight
A	10	I	4	R	7
C	3	K	2	S	5
D	4	M	3	T	12
E	15	N	6	U	5
G	2	O	8		

Or

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]