Total No. of Questions—**12**] [Total No. of Printed Pages—**4+1**

Seat No.	

[4957]-215

S.E. (Information Technology) (Second Semester) EXAMINATION, 2016

DATA STRUCTURES AND FILES

(2008 PATTERN)

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

N.B. **:—** (*i*) Attempt Q. No. **1** *or* Q. No. **2**, Q. No. 3 *or* Q. No. **4**, Q. No. **5** *or* Q. No. **6** from Section A and Q. No. **7** *or* Q. No. **8**, Q. No. **9** *or* Q. **10**, Q. **11** *or* Q. No. **12** from Section B.

(*ii*) Figures to the right side indicate full marks.

SECTION I

1. (*a*) Write a note on command line arguments. [4]

(*b*) Compare between the following file write functions : [8]

fprintf, fwrite, fputs and fputc

(*c*) Compare sequential and index sequential files. [4]

Or

2. (*a*) Write C implementation of all primitive operations on sequential file. [8]

(*b*) What are the characteristics of good hash function ? Explain collision resolutions techniques. [8]

3. (*a*) Imagine we have two empty stacks of integers s1 and s2. Draw a picture of each stack after the following operations : [8]

(1) pushStack (s1, 3)

(2) pushStack (s1, 5)

(3) pushStack (s1, 7)

P.T.O.

(4) pushStack (s1, 9)

(5) pushStack (s1, 11)

(6) pushStack (s1, 13)

(7) loop not emptyStack (s1)

(*a*) popStack)s1, x)

(*b*) pushStack (S2, x)

(8) end loop.

(*b*) Write an algorithm to convert an infix expression to prefix form. [8]

Or

4. (*a*) Clearly indicate the contents of stack during evaluation of the following postfix expression : [8]

a b – cd/* e +

The values are a = 8, b = 6 c = 10, d = 5, e = 7

(*b*) What is stack ? Give the data structures for implementation of stack using both sequential and linked organization. Give applications of stack. [8]

5. (*a*) What would be the contents of queue Q1 and queue Q2 after the following code is executed and the following data are entered : [10]

(1) Q1 = createQueue

(2) Q2 = createQueue

(3) loop (not end of file)

(*a*) read number

(*b*) enqueue (Q1, number)

(*c*) enqueue (Q2, number)

(*d*) loop (not empty Q_1)

(*i*) dequeue (Q1, x)

(*ii*) enqueue (Q2, x)

(*e*) end loop

(4) end loop

The data are 5, 7, 12, 4, 0, 4, 6.

(*b*) Write an algorithm that reverses the contents of a queue. [8]

Or

6. (*a*) Define linear queue. What are the disadvantages of linear queue? Write a pseudo C code for implementation of linear queue using linked organization. [10]

(*b*) Write a pseudo C code for implementation of priority queue. [8]

SECTION II

7. (*a*) Write non-recursive preorder and inorder traversals for binary trees. [8]

(*b*) A binary tree has 10 nodes. The preorder and inorder travesals of the tree are shown below. Draw the tree : [8]

Preorder : J C B A D E F I G H

Inorder : A B C E D F J G I H

Or

8. (*a*) Write recursive algorithm to find smallest node in binary search tree and to count number of leaf nodes. [8]

(*b*) For the following postfix expression draw equivalent tree : [8]

AB + D* EFAD* +/+C+

9. (*a*) Find the Depth-first-search traversal for the given graph. Refer fig. 1. Write an algorithm for depth-first search traversal.[8]

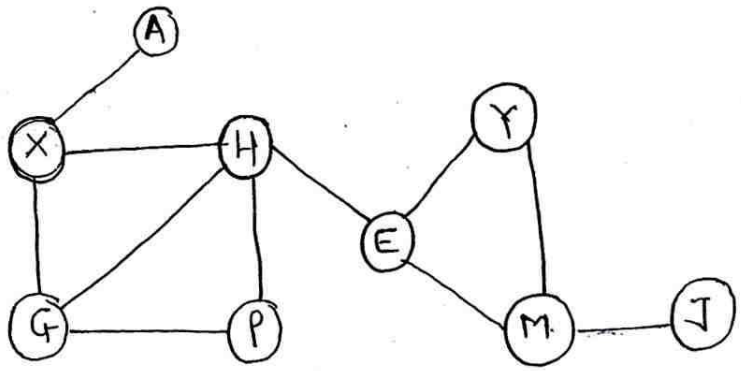

Fig. 1

(*b*) Define Graph. Describe various ways in which graphs are represented with the help of example. [8]

Or

10. (*a*) Find the MST using Prime's algorithm for the given graph. Refer figure 2. [8]

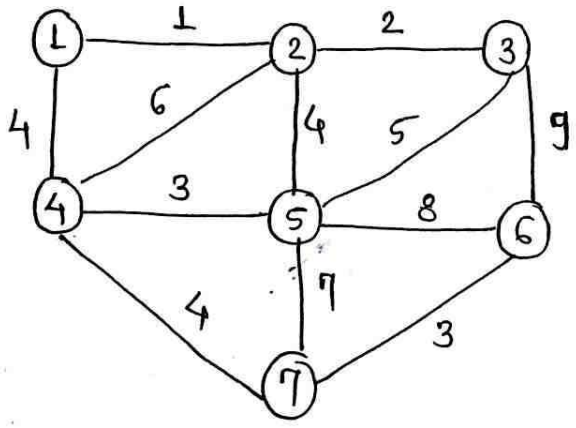

Fig. 2

(*b*) Write a pseudo code for Kruskal's algorithm. [8]

11. (*a*) For the given data build an AVL tree. Show the balance factor and type of rotation at each step. [10]

MP, MBS, MMT, NCP, AI, OOCS, DC, DS, OOP, OOMD

(*b*) Sort the following numbers in ascending order using heap sort algorithm : [8]

17, 25, 8, 0,1, 250, 1008, 65, 48, 101

Or

12. (*a*) Write short notes on following : [8]

(1) OBST

(2) AVL tree.

(*b*) For the data given below build a Huffman tree and find code of each symbol : [10]

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		