Total No. of Questions—**8**] [Total No. of Printed Pages—**4**

Seat No.	

[5152]-178

S.E. (I.T.) (II Sem.) EXAMINATION, 2017

DATA STRUCTURES AND FILES

(2012 PATTERN)

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

N.B. **:—** (*i*) Answer *four* questions.

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

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

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

1. (*a*) Write an algorithm to convert an infix expression into postfix. [6]

(*b*) Write a Pseudo code to implement priority queue using multiple linked lists, one list for each priority for servicing patients in an hospital with priorities as : [6]

(*i*) Serious (top priority)

(*ii*) Medium illness (medium priority)

(*iii*) General (least priority).

Or

2. (*a*) Write an algorithm to evaluate postfix expression. [6]

(*b*) Write a pseudo code to efficiently implement multiple queues in a single array. [6]

P.T.O.

3. (*a*) Write a non-recursive algorithm for inorder tree traversal. [4]

(*b*) Consider the following specification of a graph G : [4]

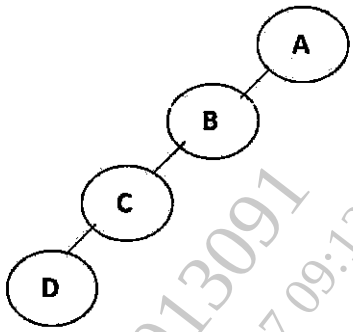
V(G) = {1, 2, 3, 4}

E(G) = {(1, 2), (1, 3), (3, 3), (3, 4), (4, 1)}

(*i*) Draw a picture of undirected graph.

(*ii*) Draw its adjacency matrix.

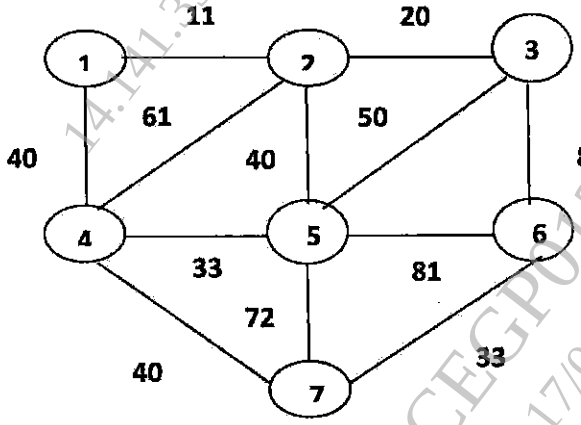
(*c*) Explain the array representation of binary tree using the following figure and explain the limitation of this representation. [4]



Or

4. (*a*) Write C++ function for insertion of a node into a BST. [4]

(*b*) Construct a minimum spanning tree using Prim's algorithm for the given graph. [4]



(*c*) Write a non-recursive algorithm for the DSF of a graph. [4]

5. (*a*) What is hashing ? Discuss about the characteristics of a good hashing function. [5]

(*b*) Sort the following number in ascending order using heap sort. Show all sorting steps : [5]

8, 20, 9, 4, 15, 10, 7, 22, 3, 12

(*b*) Suppose Max = 8 and Keys A, B, C, D have hash values Hash(A) = 3, Hash(B) = 0, Hash(C) = 4 and Hash(D) = 3. Use linear Probing for collision resolution. [4]

Or

6. (*a*) Draw a Huffman's tree for the given data set and find the corresponding Huffman's codes : [6]

Data	**Frequency**
P	18
Q	08
R	15
S	02
T	25
U	13
V	05
W	26

(*b*) Construct an AVL search tree by inserting the following elements in the order of their occurrence. Show the balance factor and type of rotation at each stage : [8]

MAR, MAY, NOV, AUG, APR, JAN,
DEC, JUL, FEB, JUN, OCT, SEP

7. (*a*) What is a File ? List various file opening modes. List the types of external storage devices. [6]

(*b*) State the advantages, disadvantages and all primitive operations of sequential files. [6]

Or

8. (*a*) Compare sequential file organization with direct access file organization. [6]

(*b*) Write a pseudo code to search a record from an index sequential file. [6]