

333453(22)

**BE (4th Semester)
Examination, Nov.-Dec., 2018
(New Scheme)**

Data Structures and Algorithm Analysis

Time Allowed : 3 hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : (i) Attempt all questions. Part (a) of each question is compulsory. Answer any two parts from (b), (c) and (d) of each question.
(ii) The figures in the right-hand margin indicate marks.

- 1. (a) What is recurrence equation? [2]
- (b) What do you mean by asymptotic running time? Explain types of asymptotic notations. [7]
- (c) Define Array. Explain about row major and column major representation of array in memory with example. [7]

- (d) Define sparse matrix. Write an algorithm to transpose the sparse matrix. [7]
- 2. (a) What do you understand by linear data structure? Give any two examples. [2]
- (b) Give the algorithm to insert elements into a doubly linked list and explain with example. [7]
- (c) Convert the following infix expression to postfix expression : [7]
 $A + (B * C - (D/E \uparrow F) * G) * H$
- (d) Write short notes on : [3+2+2=7]
 - (i) Stack
 - (ii) Queue
 - (iii) Circular Queue
- 3. (a) Explain device and concur method with example. [2]
- (b) Write an algorithm for binary search and search an element 44 from the following list : [7]
1, 22, 30, 40, 44, 55, 60, 66, 77, 80, 88, 89
- (c) Write an algorithm for Insertion sort. [7]
- (d) What is Hashing? Also explain open and closed hashing with example. [7]
- 4. (a) Write any four tree terminology with definition and example. [2]

(b) Explain binary search tree. Make a binary search tree for the following sequence of numbers :

45, 36, 76, 23, 89, 115, 98, 39, 41, 56, 69, 48

Traverse the tree in pre-order, in-order and post-order. [7]

(c) Write short notes on :

(i) AVL tree [4]

(ii) B-tree [3]

(d) What is threaded binary tree? Write an algorithm to create a threaded binary tree. [7]

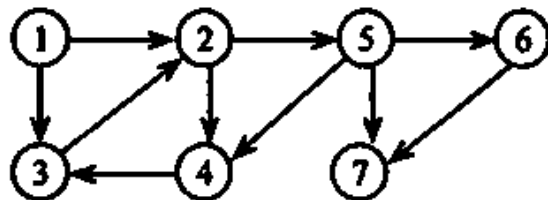
5. (a) With the reference of graph briefly define the following items : [2]

(i) Degree of vertex

(ii) Weighted graph

(b) Explain with example adjacency matrix and path matrix representation of graph. [7]

(c) Write the algorithm of DFS and BFS search algorithm. Traverse the following graph using Depth-first and Breadth-first search traversal techniques : [7]



(d) Write the algorithm for Warshall's shortest path matrix computation in detail with neat diagram. [7]

