

Code: IT3T2

II B.Tech - I Semester–Regular/Supplementary Examinations
November 2017

CLASSIC DATA STRUCTURES
(INFORMATION TECHNOLOGY)

Duration: 3 hours

Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11x 2 = 22 M

1.

- a) Differentiate between linear search and binary search.
- b) Show that $10n^2 + 4n + 2 = O(n^2)$.
- c) What are the advantages of linked list representation over array representation.
- d) Draw a picture to depict the conceptual representation of an empty doubly linked circular list with header node.
- e) Write an algorithm to insert an element into circular queue.
- f) Design the algorithm for 'IsStackEmpty' function.
- g) Differentiate between Pre order and Post order traversals on a binary tree.
- h) Describe any two properties of binary trees.
- i) Define a graph and provide an example.
- j) Define a strongly connected component.
- k) Differentiate between a tree and a graph.

PART – B

Answer any **THREE** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Write the algorithm for Insertion Sort and sort the following numbers using Insertion Sort. 8 M
45, 34, 12, 46, 27, 56, 11, 87, 6, 33, 28
- b) Write the algorithm for Quick Sort and also analyze the time complexity. 8 M
3. a) Write an algorithm for the addition of two polynomials using the linked representation. 8 M
- b) Explain the operations on singly linked lists using algorithms. 8 M
4. a) Write an algorithm for infix to postfix conversion. 8 M
- b) Discuss about the implementation of stacks using dynamic arrays. 8 M
5. a) Describe the search operation on a binary search tree with the help of an algorithm. 8 M
- b) Write the algorithm for iterative in-order traversal of binary tree. 8 M

6. a) Describe the adjacency matrix and adjacency list representation of graphs with the help of an example. 8 M
- b) Write the algorithm to perform the depth first search of a given graph and trace out the same for an arbitrary input graph. 8 M