CS/IT 216

Hall Ticket Number:

II/IV B.Tech (Supplementary) DEGREE EXAMINATION

April, 2018 — **Common to CSE & IT**

Third Semester — **Data Structures**

Time: Three Hours — **Maximum:** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)
   a) What is a data structure?
   b) What is the time complexity?
   c) What is the concept of linked list?
   d) What are the different applications of stack?
   e) What is the time complexity of merge sort in all the cases?
   f) Find the value of the prefix expression + - * 2 3 5 / ^ 2 3 4.
   g) Define binary tree.
   h) Define balance factor of a node in a binary tree.
   i) Define expression tree.
   j) Define hashing.
   k) Distinguish between minheap and maxheap.
   l) Define a directed graph.

UNIT I

2. a) Discuss different asymptotic notations with examples? 8M
   b) What are the advantages of linked lists over arrays? 4M

(OR)

3. a) Write a C program to implement insertion and deletion operations on single linked list. 8M
   b) Write a C routine to concatenate two double linked lists. 4M

UNIT II

4. a) Explain Stack ADT and Queue ADT. 4M
   b) Write a C program to implement stack using linked list. 8M

(OR)

5. a) Write an algorithm to perform insertion and deletion operations on circular queue. 6M
   b) Write a C program to convert an infix expression into postfix expression. 6M

UNIT III

6. a) Write a C program to construct BST and to perform traversals on the tree. 8M
   b) Write a C routine for searching a node in a binary tree. 4M

(OR)

7. a) Construct BST for the following data elements 6M
   15, 25, 40, 34, 70, 10, 30, 60, 12
   b) Discuss different AVL tree rotations with examples. 6M

UNIT IV

8. a) Discuss the collision resolution techniques linear probing and double hashing. 6M
   b) Explain Heat sort algorithm. Sort the following list of elements using heap sort 6M
   97, 22, 40, 110, 31, 86, 68, 4, 51, 42

(OR)

9. a) Explain Hashing technique separate chaining. 4M
   b) Discuss in detail BFS and DFS graph traversal methods. 8M