Reg. No.									

MANIPAL ACADEMY OF HIGHER EDUCATION, MANIPAL

SCHOOL OF INFORMATION SCIENCES
FIRST SEMESTER ME (EMBEDDED SYSTEMS & INSTRUMENTATION) DEGREE EXAMINATION – NOVEMBER 2018

SUBJECT: ESI 601 DATA STRUCTURES & ALGORITHMS

Tuesday, November 20, 2018

Time: 10.00 – 13.00 Hrs. Max. Marks: 100

1. (i) Define (a) An Algorithm (b) Data Structures.
(ii) Write the required structure and a function to add an item into a singly linked list.

(4+6)

2. Define stack data structure. List any four applications of stack. Write functions to push and pop elements from linked list based stack.
(2+2+3+3)

3. Explain what is a circular queue? Write the algorithm to add an item and delete an item associated with this implementation. (2+4+4)

4. For the given list 50, 70, 35, 45, 36, 40, 75, 80, 28, 65, 20 build BST and provide the in-order, pre-order and post-order traversals.. (4+6)

5. Implement Merge Sort, discuss its time complexity and illustrate with an example. (6+2+2)

6. What is hashing? Write data structures required to implement separate chain hashing (open hashing) technique. Provide functions to implement hashing, check whether element is present in the hash table. (2+3+2+3)

7. Define minimum spanning tree. Describe Kruskal's algorithm for finding the minimum spanning tree. Illustrate with an example. (2+4+4)

8. Let w = {5,7,10,12,15,18}and m = 30. Find all possible subsets of w that sum to m using back tracking. Draw the portion of the state space tree generated. (10)

9. Write the following algorithms
a) All pairs shortest path b) Knapsack problem (5+5)

10. Consider Graph G with 8 vertex. Traverse the graph with BFS and DFS. Find minimum spanning tree for the Graph G using prims algorithm. (3+3+6)