Reg. No.										

MANIPAL UNIVERSITY
SCHOOL OF INFORMATION SCIENCES

MASTER OF ENGINEERING - **ME** FIRST SEMESTER (MEDICAL SOFTWARE / **EMBEDDED SYSTEMS / EMBEDDED SYSTEMS & INSTRUMENTATION / EMBEDDED AND WIRELESS TECHNOLOGY** / COMPUTING TECHNOLOGIES & VIRTUALIZATION) / THIRD SEMESTER M.Sc. Tech (VLSI DESIGN / **EMBEDDED SYSTEMS / EMBEDDED SYSTEMS & INSTRUMENTATION / EMBEDDED AND WIRELESS TECHNOLOGY**) DEGREE EXAMINATION – APRIL / MAY 2016

SUBJECT: MMS 601/ **ESD 601/ ESI 601/ EWT 601/** VIR 601/EDA 601/ **ESD 601/ ESI 601/ EWT 601** – DATA STRUCTURES & ALGORITHMS

Thursday, April 28, 2016

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

1. Write the data structures required to implement single linked list. Write functions to delete tail node and count number of nodes in the single linked list.

   (4+4+2 = 10 marks)

2. Define stack data structure. List any four applications of stack. Write functions to add and delete elements from linked list based stack.

   (2+2+3+3 = 10 marks)

3. Write the data structures required to implement array based queue. Write functions to add and delete elements from queue.

   (4+3+3 = 10 marks)

4. What are the properties of Binary Search Tree? Provide the data structure required to implement binary search tree. Write a function for inserting elements into binary search tree.

   (2+4+4 = 10 marks)

5. Implement Merge Sort. Derive its time complexity. Give an example.

   (5+2+3 = 10 marks)

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 = 10 marks)

7. Define minimum spanning tree. Describe Prim's algorithm and Kruskal's algorithm for finding the minimum spanning tree.

   (2+4+4 = 10 marks)

8. Solve the following with greedy algorithm

A. Consider an instance of knapsack problem: n = 3, m = 20, (p1, p2, p3) = (25,24,15), and (w1, w2, w3) = (18, 15, 10). Generate at least 3 feasible solutions which include an optimal solution.

B. Let n = 4, (p1, p2, p3, p4) = (100,10,15,27) and (d1, d2, d3, d4) = (2,1,2,1). Generate the list of feasible solutions, processing sequence and profit earned. Give the Optimal solution.

(5+5 = 10 marks)

9. Clearly mentioning the required conditions, write the sum of sub set algorithm using backtracking technique.

(3+7 = 10 marks)

10. Write a function to check whether the contents of two single linked lists are same.

(10 marks)

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