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Total Number of Pages: 02

M.Sc
MMCF208

2nd Semester Regular / Back Examination– 2016-17

DESIGN AND ANALYSIS OF ALGORITHM

BRANCH(S): M.Sc.(MC)

Time: 3 Hours

Max Marks: 70

Q.CODE:Z1216

**Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.**

- Q1 Answer the following questions: (2 x 10)**
- a) What is an algorithm?
 - b) What is recursive algorithm?
 - c) What is space complexity?
 - d) Define the asymptotic notation “Big on”
 - e) Write algorithm using iterative function to find sum of n numbers.
 - f) Give the recurrence relation of divide-and-conquer?
 - g) What is greedy method?
 - h) Define post order traversal.
 - i) Give the time complexity and space complexity of traveling salesperson problem.
 - j) State 8 – Queens problem.
- Q2 a) Briefly discuss the Algorithm Analysis Framework. Write a note on measuring the input size of an algorithm. What are different ways of measuring the running time of an algorithm? (5)**
- b) What is Order of Growth? Define Worst case, Average case and Best case efficiencies. (5)**
- Q3 a) Give the general plan for analyzing the efficiency of Recursive algorithms with an example. (5)**
- b) Give an algorithm to find the smallest element in a list of n numbers and analyze the efficiency. (5)**
- Q4 Explain the Quick Sort algorithm with an example and also draw the tree structure of the recursive calls made. Analyze the efficiency of Quick sort algorithm. (10)**
- Q5 a) What is the solution of the recurrence $T(n) = T(n/2) + n \log n$, $T(1) = 1$? (5)**
- b) Give the algorithm to find the height of a Binary tree and analyze the efficiency. (5)**
- Q6 a) Explain Strassen’s Matrix multiplication with an example and analyze the efficiency. (5)**
- b) Give the Insertion Sort algorithm and analyze the efficiency. (5)**

- Q7** **a)** Give an algorithm to multiply two matrices of order $N * N$ and analyze the efficiency. **(5)**
 b) What is Heap? What are the different types of heaps? Explain how do you construct heap? Explain the Heap Sort algorithm with an example. **(5)**

- Q8** **Write short notes(Any Two) of the following** **(5 x 2)**
 a) NP-complete problems
 b) Decision Problem
 c) Dynamic Programming
 d) Greedy Problem