Roll No. ☐☐☐☐☐☐☐   **H**

TMC–501

M. C. A. (Fifth Semester)
Mid Semester EXAMINATION, 2017

DESIGN AND ANALYSIS OF ALGORITHMS

Time : 1:30 Hours]   *[Maximum Marks : 50*

Note : (i) This question paper contains two Sections.

(ii) Both Sections are compulsory.

Section—A

1. Fill in the blanks :   (1×5=5 Marks)

(a) If $f_n = C_n$, where C_n is some constant, then f_n belongs to ....

(b) Merge short is based on .... approach.

(c) .... structure is used in heap sort sorting algorithm.

(d) .... is complexity of Linear Search Algorithm.

(e) .... notation is used when the function $g(n)$ defines a lower bound for the function $f(n)$.

B-83   P. T. O.

2. Write short notes on any *five* of the following : (3×5=15 Marks)

(a) Transform and Conquer Approach

(b) Asymptotic Notation

(c) Brute Force String matching

(d) Activity Selection Problem

(e) Greedy Technique

(f) Recursive Algorithm

Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

(a) Compare the rate of growth of various complexity functions. Discuss Divide and Conquer technique using an example.

(b) Solve the recurrence relation :

$$T(n) = 2\,T(n/2) + C_n$$

Using Substitution method.

(c) Discuss the average case of time complexity for Quick Sort. How is Quick Sort different from merge sort ?

4. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

(a) Solve Recurrence Relation $T(n) = 9\,T(n/3) + n$ using Master method.

(b) Write an algorithm for Heap Sort. Sort the array A[ ] = (15, 20, 30, 40, 2, 0, 17, 45, 57, 17, 9, 23). Show the different steps involved.

(c) Explain Greedy approach to solve the fractional knapsack problem.

5. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

(a) Write an algorithm for selection sort and analyze its complexity.

(b) Define recurrence equation and explain how recurrence equations can be solved by recursive tree method.

(c) Write two algorithms to find Greatest Common Divisor (G. C. D) of two numbers and compare their complexity.