

# CBCS SCHEME

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16/17MCA33

Third Semester MCA Degree Examination, Aug./Sept. 2020

## Analysis and Design of Algorithm

Time: 3 hrs.

Max. Marks: 80

Note: Answer FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Define the term algorithm and discuss the fundamentals of algorithmic problem solving. (08 Marks)  
b. Discuss the need of data structures and explain linked lists, stack, queues, graphs and trees. (08 Marks)

OR

- 2 a. What are asymptotic notations? Discuss bigoh(O), big omega( $\Omega$ ) and theta( $\theta$ ) notations in detail. (08 Marks)  
b. Write the procedure for mathematical analysis of recursive and non recursive algorithms and explain each with suitable example. (08 Marks)

### Module-2

- 3 a. With suitable comments, write the algorithm for bubble sort and give its analysis. (07 Marks)  
b. What is divide and conquer strategy? And hence write an algorithm for merge sort with suitable comments. (09 Marks)

OR

- 4 a. Write an algorithm for quick sort algorithm and discuss the significance of Pivot(key) element. (10 Marks)  
b. Demonstrate the working of quick sort algorithm on the list of integers : [14 1 16 11 12 20 4 15 3 19] in detail. (06 Marks)

### Module-3

- 5 a. Discuss the technique of Strassen's matrix multiplication in detail. (08 Marks)  
b. Write the algorithm for insertion sort on the list of integers in descending order and give its analysis. (08 Marks)

OR

- 6 a. With the help of suitable example, describe the topological sorting using DFS and source removal method. (08 Marks)  
b. Write the algorithm for comparison counting sort and discuss the working of the same for the following : 62 31 84 96 19 47. (08 Marks)

### Module-4

- 7 a. Describe the input enhancement in string matching with the help of Horspool's algorithm. (09 Marks)  
b. Explain the significance of bad-symbol table and good, Suffix table in Boyer – Moore's algorithm with suitable example. (07 Marks)

OR

- 8 a. Explain open – hashing and closed hashing with relevant examples. (06 Marks)  
b. Write Warshall's and Floyd's algorithm and explain the working with example. (10 Marks)

### Module-5

- 9 a. What is backtracking? Justify the same with 4 – queen's problem. (08 Marks)  
b. Explain the following : i) Sum – of – subset problem ii) Knapsack problem. (08 Marks)

OR

- 10 a. What are decision trees? Explain the same with three – element insertion sort. (08 Marks)  
b. Explain P and NP problems in detail. (08 Marks)

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VTU9-3/7/20

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.