M.Sc. IV SEMESTER [MAIN/A.T.K.T.] EXAMINATION APRIL-MAY, 2019

COMPUTER SCIENCE

Paper - II

[Design and Analysis of Algorithms]

[Max. Marks : 75] *[Time : 3:00 Hrs.]* *[Min. Marks : 26]*

Note : Candidate should write his/her Roll Number at the prescribed space on the question paper.
Student should not write anything on question paper.
Attempt five questions. Each question carries an internal choice.
Each question carries **15 marks.**

Q. 1 a) How is an Algorithm Analyzed ? Explain with a suitable example. **(5 marks)**

b) Write an algorithm for searching an element in sorted array what is the complexity of the algorithm. **(10 marks)**

OR

a) Explain Master theorem with example for recurrence relation. **(5 marks)**

b) What do you mean by merge sort write algorithm and analyze your algorithm of diff. case. **(10 marks)**

Q.2 a) Write a complete recursive algorithm for generating Fibonacci no. and convert it to an equivalent iteration algorithm **(7 marks).**

b) Explain concept of assembly line scheduling. **(8 marks)**

OR

a) Explain concept of O/I knapsack problem with suitable example. **(8 marks)**

b) Explain concept of matrix chain multiplication. **(7 marks)**

Q. 3 a) Show that greedy strategy will not work for 0-1 knap sack problem give a dynamic programming based solution for this problem. **(7 marks)**

b) Write down comparison of Greedy method and dynamic programming method. **(8 marks)**

OR

Find an optimal solution to the following knapsack problem. (15 marks)

No. of object n = 3

Knap sack capacity m = 20

Profits $(P_1, P_2, P_3) = (25, 24, 15)$

Weight $W_1 = 18$

$W_2 = 15$

$W_3 = 10$

Q. 4 a) Explain the concept of BFS and DFS and analyze the running time algorithm. (8 marks)

b) Explain concept of minimum spanning tree with example. (7 marks)

OR

Write algorithm for computing the shortest path with suitable example (Prim's algorithm). (15 marks)

Q. 5 a) Discuss the relationship between class P, NP, NP - complete and NP - hard with example of each class. (7 marks)

b) Explain concept of deterministic and non - deterministic with example. (8 marks)

OR

a) Show that the traveling salesman problem is NP complete. (8 marks)

b) Explain approximation algorithm eq. (7 marks)