

Hall Ticket Number:

Y 1 8 A C S 5 3 7

II/IV B.Tech (Regular) DEGREE EXAMINATION

November, 2020

Fourth Semester

Time: Three Hours

Common to CSE and IT
Design and Analysis of Algorithms

Maximum: 50 Marks

Answer ALL Questions from PART-A

Answer ANY FOUR questions from PART-B

(1X10 = 10 Marks)

(4X10=40 Marks)

PART-A

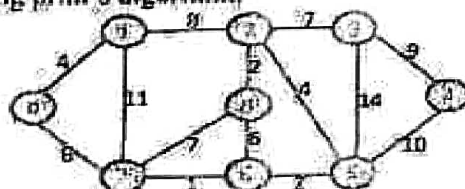
1. a) What are the basic characteristics of an Algorithm? CO1
- b) Difference between Best case and Worst case complexities? CO1
- c) What are the problems can be solved using Divide and Conquer technique? CO2
- d) Define Minimum Cost Spanning Tree. CO2
- e) Define single source shortest path problem. CO2
- f) What are the drawbacks of Dynamic Programming? CO3
- g) What are the applications of DFS? CO3
- h) What is meant by Articulation Point? CO3
- i) Define Back Tracking. CO4
- j) What is the relationship between P and NP? CO4

PART-B

2. a) Explain about Big Oh and Omega notations with examples. Write an algorithm to find the max element of an array and perform time complexity analysis using step-able method. CO1 5M
- b) Explain any two cases of master theorem with examples. Solve the following recurrences using master theorem a) $T(n) = 8T(n/2) + 100n^2$, b) $T(n) = 2T(n/2) + 10n$ CO1 5M
3. a) Write the complete pseudo code conventions for expressing algorithms. CO1 5M
- b) Write the general form of a recurrence relation. Explain substitution method of solving recurrence relation and solve the following recurrence using substitution method. CO1 5M

$$T(n) = 7T(n/2) + 18n^2 \quad \text{if } n > 1$$

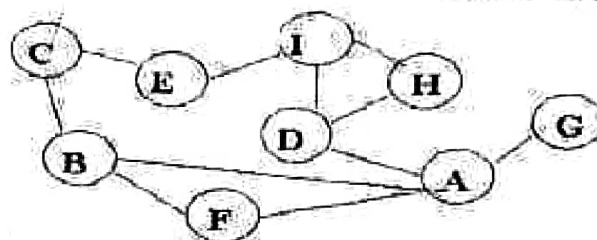
$$= 1 \quad \text{if } n = 1$$
4. a) Write an algorithm for merge sort. CO2 5M
- b) Sort the following elements using Quick sort algorithm. 55, 33, 11, 88, 22, 44, 77. CO2 5M
5. a) Write and explain fractional knapsack problem algorithm. CO2 6M
- b) Solve the given graph using prim's algorithm. CO2 5M



6. a) Formulate and explain dynamic programming solution for LCS problem. CO3 4M
- b) Solve the given data with using LCS problem CO3 6M
 $X = B A C A D, Y = A C C B A D C B$

7. a) Write DFS Algorithm and explain its working with an example.

CO3



5M

- b) Find strongly connected components in the given graph
8. a) Draw state space tree and solve 4×4 Queens problem using back tracking algorithm.
- b) Write sum of subsets algorithm.
9. a) Solve 0/1 knapsack problem in LCBB using given details.
 $P = \{10, 10, 12, 18\}$, $W = \{2, 4, 6, 9\}$, $n=4$ and $m=15$
- b) Write cook's theorem

CO3 5M

CO4 5M

CO4 5M

CO4 5M

CO4 5M

