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Total Pages : 3

220301

December, 2019

MCA- III SEMESTER

Analysis and Design of Algorithms (MCA-17-201)

Time : 3 Hours] [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART - A

1. (a) Discuss basic characteristics of an algorithm. (1.5)

(b) Explain concept of recursion for solving problems. (1.5)

(c) Explain masters theorem. (1.5)

(d) Define Hamiltonian Cycle. (1.5)

(e) Define Reducibility. (1.5)

(f) Explain practical applicability of graph colouring problem. (1.5)

(g) Define minimum spanning tree. (1.5)

(h) State clique problem. (1.5)

(i) Describe sequence of steps used in analysis of an algorithm. (1.5)

(j) Discuss importance of asymptotic notations. (1.5)

PART - B

2. (a) Discuss the Asymptotic notation $O(g(n))$, $\Omega(g(n))$ and $\Theta(g(n))$ with example. (10)

(b) Explain the divide and conquer approach for analyzing an algorithm. (5)

3. (a) Write an algorithm for creating a binary search tree by taking the following elements (65, 43, 15, 78, 34, 83, 100, 12). (5)

(b) What do you understand by Greedy method ? Discuss the Knapsack Problem. (10)

4. (a) Define backtracking. Solve 8-queens problem using backtracking. (10)

(b) State and explain general Least Count search method. (5)

5. (a) Write steps to solve 0/1 knapsack problem using dynamic programming. Take suitable example. (5)

(b) Discuss and explain Strassen's Matrix multiplication algorithm. (10)

6. (a) Describe the strategy that is used to show that the given problem is an NP-Hard problem. (5)

(b) Define optimal binary search tree. Write steps to construct an optimal binary search tree. (10)

7. (a) Describe the strategy that is used to show that the given problem is an NP-Hard problem. (10)

(b) Explain the vertex cover problem. (5)