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MCA-12/M.Sc.IT-12

Design and Analysis of Algorithm

Master of Computer Application/Master of Science in Information Technology

(MCA/M.Sc.IT-11/12/16/17)

3rd Semester Examination June 2022

Time : 2 Hours Max. Marks : 80

Note : This Paper is of Eighty (80) marks divided into two (02) Section A and B. Attempt the questions contained in these sections according to the detailed instructions given there in.

Section-A

(Long Answer-type questions)

Note: Section 'A' contains Five (05) Long-answer type questions of Twenty (20) marks each. Learners are required to answer any two (02) questions only.

(2 x 20 = 40)

Q.1. What is an Algorithm? What is the need to study Algorithms? What is complexity? Define Time Efficiency and Space Efficiency.

P.T.O.

Q.2 Explain Red-Black Trees. What are the Red-Black properties? Construct Red Black Tree for the following : **12, 43, 23, 54, 76, 45, 11**.

Q.3 Explain Backtracking technique. Explain n-queen problem (n=4).

Q.4 State and prove Master Method.

Q.5 Explain Graph. What is minimum spanning tree in graph? Explain Prim's algorithms with example.

Section-B

(Short Answer-type questions)

Note: Section 'B' contains Eight (08) Short-answer type questions of ten (10) marks each. Learners are required to answer any four (04) questions.

(4 x 10 = 40)

P.T.O.

Q.1 What are Asymptotic Notations? Explain.

Q.2 A red-black tree with 'n' internal nodes has height at most **2 lg (n+1)**. Prove.

Q.3 Differentiate between Recursion and Recurrence? Explain with example.

Q.4 Explain Rabin Karp algorithm for string matching.

Q.5 Differentiate between dynamic and greedy algorithm.

Q.6 Explain binomial heap. Provide an algorithm for searching minimum value in binomial heap.

Q.7 Explain the basic principle of Divide and Conquer method.

Q.8 Find LCS for the following data :
X:110110101 Y:10101010

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