

**MCA-12**

June - Examination 2016

**MCA IInd Year Examination****Design and Analysis of Algorithm****Paper - MCA-12****Time : 3 Hours ]****[ Max. Marks :- 80**

**Note:** The question paper is divided into three sections A, B and C. Write answers as per given instructions.

**Section - A****8 × 2 = 16**

(Very Short Answer Questions)

**Note:** Answer **all** questions. As per the nature of the question delimit your answer in one word, one sentence or maximum upto 30 words. Each question carries 2 marks.

- 1) (i) Define time and space complexity.
- (ii) What are searching algorithms?
- (iii) Explain the need of Analysis of Algorithm.
- (iv) What is divide and conquer strategy?
- (v) Explain the concept of backtracking.
- (vi) Define a Hamiltonian Cycle.
- (vii) What is the requirement of branch and bound techniques?
- (viii) What is reducibility?

**Section - B****4 × 8 = 32**

(Short Answer Questions)

**Note:** Answer **any four** questions. Each answer should not exceed 200 words. Each question carries 8 marks.

- 2) Explain Knapsack problem with an example.
- 3) Explain the flow shop scheduling.
- 4) Write briefly about sets and disjoint sets.
- 5) Explain, what optimal binary search tree is?
- 6) Explain the characteristics of dynamic programming.
- 7) What are NP-hard and NP-Complete problem classes?
- 8) Explain the solution of 8-Queen's problem.
- 9) Use the master method to give tight asymptotic bounds for the following recurrences.
  - (i)  $T(n) = 4T(n/2) + n$ .
  - (ii)  $T(n) = 4T(n/2) + n^2$ .
  - (iii)  $T(n) = 4T(n/2) + n^3$ .

**Section - C****2 × 16 = 32**

(Long Answer Questions)

**Note:** Answer **any two** questions. You have to delimit your each answer maximum upto 500 words. Each question carries 16 marks.

- 10) Explain the NP-Complete Algorithm. Prove that formula satisfiability is an NP Complete problem.
- 11) Explain the Merge-sort Algorithm with suitable example. Analyze the time complexity of the Merge Sort algorithm (Worst, Best and Average Case).
- 12) What is greedy approach of problem solving? Explain Knapsack Problem.
- 13) Explain the quick-Sort Algorithm with suitable example. Analyze the time complexity of the Quick sort algorithm (Worst, Best and Average Case).

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