

MCA-12

December - 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) What is the time complexity of Binary search algorithm for best, average and worst case?
- (ii) What are the factors on which efficiency of an algorithm depends?
- (iii) Define space complexity.
- (iv) What are asymptotic notations? Name all.
- (v) Divide and conquer algorithm is applied in a problem when sub-problems are of which type?
- (vi) What is greedy strategy for knapsack problem?

(vii) What is minimum spanning tree?

(viii) What are the two classes of NP-problem?

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.

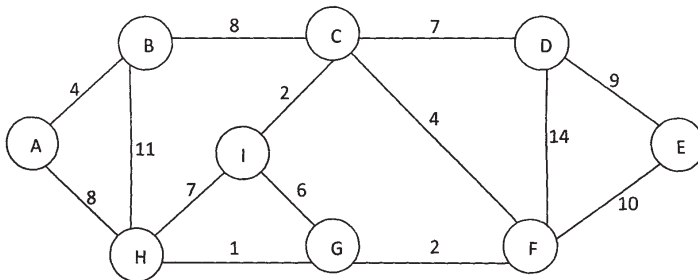
- 2) On what kind of input does the Quick sort algorithm exhibit its worst case behaviour? Why?
- 3) State and prove Cook's theorem.
- 4) Show that travelling salesman problem in NP-Complete.
- 5) What are the advantages of dynamic programming approach over divide and conquer approach and greedy approach?
- 6) Define how knapsack problem is solved by using dynamic programming approach.
- 7) Explain 4 Queens and 8 Queens Problem.
- 8) Which one is better in term of space complexity, Quick sort or Merge sort? Justify your answer.
- 9) Explain job sequencing problem with deadlines. How it can be solved by Greedy approach.

Section - C $2 \times 16 = 32$

(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) What is the significance of using notations in analysis of algorithms? Explain various notations in brief.
- 11) Explain the heap operation and Heap sort. Illustrate the operation of heap and sort the following array:
 $A = \langle 5, 13, 2, 25, 7, 17, 20, 8, 4 \rangle$
- 12) Find minimum spanning tree using prim's and kruskal's algorithm.



- 13) Solve the travelling salesman problem having the following cost matrix, using branch and bound technique.

∞	20	30	10	11
15	∞	16	4	2
3	5	∞	2	4
19	6	18	∞	3
16	4	7	16	∞