

Roll No.

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J-3537[S-1393]

[2037]

M.Sc. (BI) (Semester - 2nd)

DESIGN AND ANALYSIS OF ALGORITHMS (M.Sc. (BI) - 203)

Time : 03 Hours

Maximum Marks : 75

Instruction to Candidates:

- 1) Section-A is **compulsory**.
- 2) Attempt any **Nine** questions from Section-B.

Section - A

Q1)

(15 × 2 = 30)

- a) Differentiate between Binary and Binary Search Tree.
- b) What are maximum and minimum numbers of elements in a heap of height h?
- c) What is space complexity?
- d) What are the various steps in the design of an algorithm?
- e) The order of complexity of binary search (successful case) in best case is in average case is and in worst case is
- f) What are the various techniques for design of algorithm?
- g) Which is more efficient Breadth first Search or Depth first Search?
- h) What is lower bound?
- i) What is the algorithm for in-order traversal?
- j) Give brief concept of Divide & Conquer.
- k) What is a solution space in the backtracking technique?
- l) Give an example of an algorithm, which is infinite in nature.
- m) What are Explicit & Implicit constraints?
- n) Differentiate b/w complete & full binary tree.
- o) What is recursion? What are its drawbacks?

P.T.O.

Section - B

(9 × 5 = 45)

- Q2)** Define algorithm? Also explain the different criteria that all algorithms must satisfy.
- Q3)** Solve 4- queen problem using backtracking.
- Q4)** How does Heap sort work?
- Q5)** What is NP-hard and NP-complete with example?
- Q6)** Explain the different terminologies that we use for trees and graphs.
- Q7)** Explain why we use asymptotic notation. Also define the following notations:
- (a) big O
 - (b) Omega
 - (c) Theta
- Q8)** Give algorithms for the Graph traversal techniques.
- Q9)** What type of operations can be performed on strings? Explain at least two operations on strings with algorithms.
- Q10)** What are the advantages of dynamic programming over the greedy method?
- Q11)** Write an algorithm to delete an element from a linked list. Also mention the worst case running time for this operation.
- Q12)** Explain the concept of Connected and Bi-connected components in Graphs.
- Q13)** What are approximation algorithms? Define absolute approximation and E-approximation with example.

