

Roll No.

Total No. of Questions : 09]

[Total No. of Pages : 02

B.Tech. (Sem. - 5th)
DESIGN AND ANALYSIS OF ALGORITHMS
SUBJECT CODE : CS - 307
Paper ID : [A0467]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

Section - A

(10 × 2 = 20)

Q1)

- a) What do you mean by term order of complexity?
- b) Describe a path in an undirected path.
- c) Define recurrence relation?
- d) What do you mean by worst case analysis?
- e) Define Non-deterministic algorithm.
- f) Give brief concept of Divide & Conquer.
- g) What is stable sorting?
- h) What are the various steps in the design of an algorithm?
- i) What is NP Complete Problem?
- j) What are the conditions under which backtracking can be used.

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Section - B

(4 × 5 = 20)

- Q2)** What are the various mathematical notations used to analyze an algorithm. Explain briefly? Explain the trade-off between time and space while analyzing an algorithm.
- Q3)** Write a string processing algorithm to identify whether a particular sequence of characters is there in the string or not.
- Q4)** What are the features of branch and bound algorithms? Discuss in detail.
- Q5)** What is the difference between binary and binary search tree? Explain with the help of suitable examples?
- Q6)** Write an algorithm for Quick sort and find its complexity?

Section - C

(2 × 10 = 20)

- Q7)** Explain basic concepts of P, NP, NP-hard and NP-complete problems.
- Q8)** What do you mean by complexity of an algorithm? Define time and space complexity with examples.
- Q9)** (a) Among Merge sort, Insertion sort and Bubble sort which sorting technique is the best in worst case. Support your arguments with an example and analysis.
- (b) What do you mean by dynamic programming? Explain with the help of suitable examples.

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