

**CSE -306 F Analysis and Design of Algorithms**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Class Work</b>	<b>:</b>	50 Marks
3	1	-	<b>Exam</b>	<b>:</b>	100 Marks
			<b>Total</b>	<b>:</b>	150 Marks

**Duration of Exam : 3 Hrs.**

**NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

**Section-A**

**Brief Review of** Graphs, Sets and disjoint sets, union, sorting and searching algorithms and their analysis in terms of space and time complexity.

**Divide and Conquer:** General method, binary search, merge sort, quick sort, selection sort, Strassen's matrix multiplication algorithms and analysis of algorithms for these problems.

**Section-B**

**Greedy Method:** General method, knapsack problem, job sequencing with dead lines, minimum spanning trees, single source paths and analysis of these problems.

**Dynamic Programming:** General method, optimal binary search trees, 0/1 knapsack, the traveling salesperson problem.

**Section-C**

**Unit-5: Back Tracking:** General method, 8 queen's problem, graph colouring, Hamiltonian cycles, analysis of these problems.

**Unit-6: Branch and Bound:** Method, 0/1 knapsack and traveling salesperson problem, efficiency considerations. Techniques for algebraic problems, some lower bounds on parallel computations.

**Section-D**

**Unit-7: NP Hard and NP Complete Problems:** Basic concepts, Cook's theorem, NP hard graph and NP scheduling problems some simplified NP hard problems.

**Text Books:**

- Fundamental of Computer algorithms, Ellis Horowitz and Sartaj Sahni, 1978, Galgotia Publ.,
- Introduction To Algorithms, Thomas H Cormen, Charles E Leiserson And Ronald L Rivest: 1990, TMH

**Reference Books:**

- The Design and Analysis of Computer Algorithm, Aho A.V. Hopcroft J.E., 1974, Addison Wesley.
- Algorithms-The Construction, Proof and Analysis of Programs, Berlion, P.Bizard, P., 1986. Johan Wiley & Sons,
- Writing Efficient Programs, Bentley, J.L., PHI
- Introduction to Design and Analysis of Algorithm, Goodman, S.E. & Hedetniemi, 1997, MGH.
- Introduction to Computers Science- An algorithms approach , Jean Paul Trembley, Richard B.Bunt, 2002, T.M.H.
- Fundamentals of Algorithms: The Art of Computer Programming Voll, Knuth, D.E.: 1985, Naresh Publ.