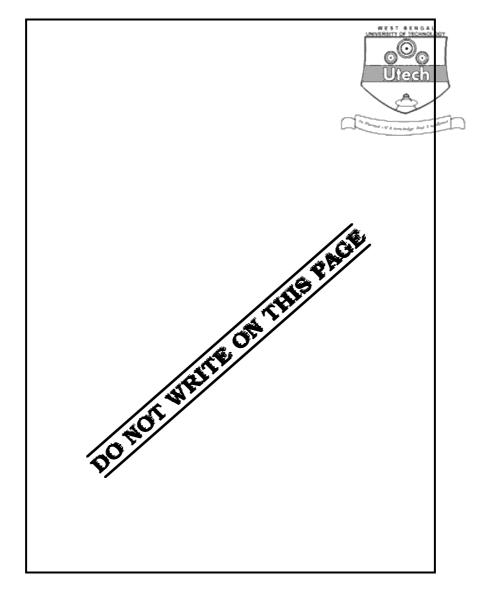
CS/M.Tech (MSS)/SEM-2/MSS-206/09 DESIGN & ANALYSIS OF ALGORITHMS (SEMESTER - 2)

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	CS/M.Tech (MSS)/SEM-2/MSS-206/09 ENGINEERING & MANAGEMENT EXAMINATIONS, JULY – 2009 DESIGN & ANALYSIS OF ALGORITHMS (SEMESTER - 2)																	
Tim	e : 2 Ho	urs]										[Fu	ll Ma	arks	s : 70			
1. 2. 3. 4. 5. 6.	TRUCTIONS TO THE CANDIDATES: This Booklet is a Question-cum-Answer Booklet. The Booklet consists of 32 pages. The questions of this concerned subject commence from Page No. 3. You have to answer the questions in the space provided marked 'Answer Sheet'. Write on both sides of the paper. Fill in your Roll No. in the box provided as in your Admit Card before answering the questions. Read the instructions given inside carefully before answering. You should not forget to write the corresponding question numbers while answering. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules. Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, which will lead to disqualification.																	
9.	Rough	work, if necessary is	to be done in tl	his boo	klet o	ıly an	d cros	s it th	roug	h.								
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36014 (07/07)

Head-Examiner/Co-Ordinator/Scrutineer







CS/M.Tech (MSS)/SEM-2/MSS-206/09 DESIGN & ANALYSIS OF ALGORITHMS

SEMESTER - 2

Time: 2 Hours] [Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer any five questions.

 $5 \times 14 = 70$

- 1. Define NP-hard and NP-complete problems. How do you prove the NP-hardness of a given problem? Prove that the clique decision problem is NP-hard. 4 + 3 + 7
- 2. What is an AND-OR graph? How to construct an AND-OR graph for a given problem? Construct an AND-OR graph to decide whether the Boolean expression p.(q+r'.s')+r'.(r+s'.(s+p)) is satisfiable or not. 2+4+8
- 3. a) Explain the terms a priori complexity analysis and a posteriori complexity analysis. Differentiate, with a proper example, among best case, average case and worst case time complexity of an algorithm. 2+6
 - b) Define the big-oh (O), omega (Ω) and the theta (Θ) notations. Consider the function f(n) = 18n + 10. Prove that $f(n) = \Theta(n)$.
- 4. What do you mean by backtracking? Present a backtracking algorithm to solve the n-queen problem and apply it to solve the 4-queen problem. Show the intermediate steps. 2+6+6
- 5. Do you agree with the statement 'The concept of an algorithm is formalized as a Turing Machine (TM)'? Justify your answer.
- 6. Design a Turing Machine to copy a given string w of consecutive a's to ww, i.e., to a string of twice as many consecutive a's. Explain its way of working. 9 + 5

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- 7. Present a generalized graph search algorithm and explain its way of functioning. How do you obtain the breadth-first search (BFS) and depth-first search (DFS) as special cases of the generalized graph search algorithm? Given a certain graph search problem, which of BFS or DFS is more efficient than the other? Justify your answer with suitable examples. 4 + 4 + 6
- 8. Explain the basic strategy of 'A' algorithm. How does it differ from A^* algorithm? Present an A^* algorithm to solve the Travelling Salesperson Problem (TSP). 3 + 2 + 9

END