DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
THIRD SESSIONAL
SUBJECT: (IT 509) Design And Analysis of Algorithm

Examination	**: B.TECH Semester - V**	**Seat No.**	**:**
Date	**: 17/10/2016**	**Day**	**: Monday**
Time	**: 12:45 To 2:00**	**Max. Marks**	**: 36**

INSTRUCTIONS:
1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume any necessary data but giving proper justifications.
4. Be precise, clear and to the point in answering the questions. Unnecessary elaborations will not fetch more marks.

Q.1 Do as directed. **[12]**

(a) For problems X and Y, Y is NP-complete and X reduces to Y in polynomial time. Which of the following is TRUE? **[1]**
(A) If X can be solved in polynomial time, then so can Y
(B) X is NP-complete
(C) X is NP-hard
(D) X is in NP, but not necessarily NP-complete

(b) Discuss difference between DFS and BFS techniques. **[2]**

(c) Discuss difference between NP Complete and NP Hard problems. **[2]**

(d) Compare Deterministic and Non Deterministic Algorithms. **[2]**

(e) Discuss Hamiltonian Cycle problem, prove with argument it is NP-Complete problem and write Non Deterministic algorithm for finding Hamiltonian Cycle from graph G(V, E), and analyze its time complexity for the same. **[4]**

(f) If $A \leq_p B$ and B belongs to NP-Complete, then A belongs to which class? [P/NP/NP-Complete/NP-Hard] **[1]**

Q.2 Attempt ***Any TWO*** of the following questions. **[12]**

(a) Discuss backtracking solution for N-Queen problem and write the algorithm for the same. **[6]**

(b) Comparison based sorting algorithms take Ω(nlogn) time, prove it using decision tree model with proper justification. [With theorem you have to prove lemma also] **[6]**

(c) Discuss assembly line scheduling problem, write the dynamic programming algorithm and analyze its time and space complexity. **[6]**

Q.3 (a) Discuss backtracking solution for 0/1 knapsack problem and write the algorithm for the same. **[6]**

(b) Write the dynamic programming algorithm for finding longest common subsequence of two sequences and analyze its time and space complexity. **[6]**

OR

Q.3 (a) Discuss the principle operations involve in designing Non Deterministic algorithms. Design Non Deterministic Searching and Sorting algorithm and compare its complexity with deterministic algorithms to do the same. **[6]**

(b) Discuss String Edit (Edit Distance) problem, write the dynamic programming algorithm and analyze its time and space complexity. **[6]**