DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
BLOCK EXAMINATION (REGULAR)
SUBJECT: (IT 509) Design And Analysis of Algorithm

Examination	**: B.TECH Semester - V**	**Seat No.**	**:**
Date	**: 22/10/2018**	**Day**	**: Monday**
Time	**: 11:00 – 12:15**	**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) What are the properties of algorithm? Explain each in brief. **[2]**

(b) Solve the following recurrence using master theorem: $T(n) = 4T\left(\frac{n}{3}\right) + n$ **[2]**

(c) Compare greedy technique with dynamic programming. Give an example with brief justification where greedy paradigm is preferable compare to dynamic programming. **[2]**

(d) Prove or disprove the optimal substructure property of finding longest path in a graph problem. **[2]**

(e) Discuss the difference between backtracking and branch and bound techniques. **[2]**

(f) If A $\leq_p$ B and B belongs to NP-Hard, then A belongs to which class? [P/NP/NP-Complete/ NP-Hard] [Justification Required] **[2]**

Q.2 Attempt the following questions. **[12]**

(a) Find the Edit Distance between string x="SUNDAY" and y="SATURDAY" using dynamic programming. **[6]**

(b) Write the MIN-MAX algorithm using Divide and Conquer paradigm. Derive the recurrence equation and find the asymptotic complexity. **[6]**

Q.3 (a) Explain the dynamic programming based algorithm for 0/1 knapsack problem and derive its time complexity. **[6]**

(b) Explain best case and worst case behavior of Quick Sort algorithm. Also, suggest how to make sure O(nlogn) complexity for Quick sort algorithm? **[6]**