

**P P SAVANI UNIVERSITY**  
**P P SAVANI SCHOOL OF ENGINEERING**  
**5<sup>th</sup> Semester of B Tech Examination (2<sup>nd</sup> Internal Exam)**  
**Subject: Design & Analysis of Algorithms (SEIT3032)**  
**Branch: CE/IT**

[Date: 01/10/2019, Tuesday]

[Time: 02.00 P.M. to 03.00 P.M.]

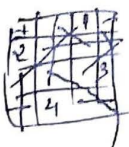
[Total Marks: 30]

**Instructions:**

- Figures to the right indicate full marks.
- Use of scientific calculator is allowed.
- Draw neat and clean drawings & Assume suitable data if necessary.

- Q.1 Find optimal solution to the knapsack problem by dynamic programming instance  $n=6$ , (05)  
 Capacity=15,  $(p_1 \dots p_6) = (10, 5, 15, 7, 6, 18)$ ,  $(w_1 \dots w_6) = (2, 3, 5, 7, 1, 4)$
- Q.2 Write the backtracking algorithm for the sum of subsets problem using the state space tree (05)  
 corresponding to  $\text{Sum}=35$ ,  $S=\{20, 18, 15, 12, 10, 7, 5\}$  10 15 20
- Q.3 State the principle of optimality. Solve multi stage graph using dynamic programming. (05)
- Q.4 Design Native string matching algorithm with example. What is the time complexity of the algorithm? (05)
- Q.5 Devise backtracking algorithm to find solution to the 4-queens problem and represent the solution space in state space tree. (05)
- Q.6 (a) "The class of NP is the class of problems that can never be solved in polynomial time". (03)  
 True/False  
 If the statement is true, explain why it is true. If it is false, explain what the correct answer is and why.
- Q-6 (b) Define NP-Hard and NP-Completeness. (02)

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7  
72<sup>n</sup> 4<sup>n</sup>