JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, February/March - 2022
ADVANCED ALGORITHMS
(Computer Science and Engineering)

Time: 3 Hours   **Max. Marks: 75**

Answer Any Five Questions
All Questions carry equal marks
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1.a) Write an algorithm of OBST.
  b) Derive the time complexity of quick sort in an average case.   [7+8]

2.a) What is the running time of HEAPSORT on an array A of length n that is already sorted in increasing order? What about decreasing order?
  b) Use the substitution method to solve the following recurrence relation $T(n) = 3T(n/2)+n$.
                                                                                    [8+7]

3.a) Write an algorithm of Activity selection algorithm.
  b) Explain about Topological sorting.   [8+7]

4.a) State and explain Prim's algorithm with an example.
  b) Write an algorithm of single source shortest path.   [8+7]

5.a) Illustrate the zero-one principle with an example. Prove that an n-input sorting network must contain atleast one comparator between the ith and $(i + 1)^{st}$ lines for all $i = 1, 2, \ldots, n - 1$.
  b) Explain about Comparision Network.   [7+8]

6.a) Derive the strassen's matrix multiplication.
  b) Explain the applications of merging networks.   [10+5]

7. Write an algorithm of Rabin-Karp and also illustrate with an example.   [15]

8.a) What is the vertex-cover problem? Give an example of a graph for which APPROX-VERTEX-COVER always yields a suboptimal solution.
  b) Illustrate an Algorithm that computes the traveling-salesman problem with triangle inequality.   [8+7]

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