CLASS: BE   SEMESTER: VII
BRANCH: IT   SESSION : MO/2018

SUBJECT : IT5027 DESIGN OF COMPUTER ALGORITHMS

TIME: 1.5 HOURS   FULL MARKS: 25

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

Q1   (a) What is an algorithm?   [2]
     (b) Discuss in detail the different asymptotic notations.   [3]

Q2   (a) How to analyze the time efficiency of non-recursive algorithms? Explain. [2]
     (b) Given a sorted array of distinct integers, some of which may be negative, give an   [3]
          algorithm to find an index i such that $1 \leq i \leq n$ And A[i]=i provided such an index exists. If
          there are many such indices, the algorithm can return any one of them

Q3   (a) Write pseudo code for binary search.   [2]
     (b) Explain the working of quick sort algorithm with example.   [3]

Q4   (a) Solve the following recurrence relations using back substitution method : [2]
          T(n) = 2T(n/2)+ nlogn
     (b) Decide whether these statements are True or False. You must briefly justify all your   [3]
          answers
          If $f(n) = \Theta(g(n))$ and $g(n) = \Theta(h(n))$, then $h(n) = \Theta(f(n))$
          If $f(n) = O(g(n))$ and $g(n) = O(f(n))$ then $f(n) = g(n)$

Q5   (a) Construct a max-heap with following values 3,13,6,15,18,20,25,30 with explanation.   [2]
     (b) Write a psudo code for divide and conquer algorithm for merging two sorted array into   [3]
          a single sorted arrey. Explain with an example.

Q6   (a) Differentiate between BFS (Bredth First Search) and DFS (Depth First Search).   [2]
     (b) The convex hull of the set of points is the smallest convex polygon that contain all the   [3]
          points of it. Write an algorithm to find a convex hull of given points.

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