SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

ROLL No: | | | | | | | | | | | | | Total number of pages:[2]

B.Tech. || CSE || 5th Sem

Design and Analysis of Algorithms

Subject Code:BTCS-503

Batch:2015(Regular)

Paper ID:

Time allowed: 3 Hrs **Max Marks: 60**

Important Instructions:

- **All questions are compulsory**
- **Assume any missing data**
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PART A **(10x 2marks)**

Q. 1. Short-Answer Questions: [All COs]

(a) What is difference between Polynomial and Exponential running time?
(b) Define Convex Hull.
(c) Write the difference between Divide and Conquer and Dynamic Programming.
(d) State Principle of Optimality.
(e) Write time Complexity of Radix Sort.
(f) Describe the general principle of Divide and Conquer.
(g) What is the significance of the lower bound of an Algorithm?
(h) What is the working principle of Quicksort?
(i) What are the applications of Fast Fourier Transform(FFT) ?
(j) What is difference between Prim's and Kruskal's algorithm for finding minimum cost spanning tree?

PART B **(5×8marks)**

Q. 2. What is meant by time complexity and space complexity? Discuss its importance. Explain the Heapsort with an example. [CO1]

OR

Use the Master Theorm method to show that the solution of recurrence relation:-
$T(n)= 2T(n/2) + n^2$ is $T(n)= \theta(n^2)$

Q. 3. What is Greedy method? Explain the algorithm for Knapsack problem using Greedy method. [CO2]

OR

Discuss the solution for Travelling Salesman problem using Dynamic programming.

Q. 4. What are Asymptotic notations? Describe with the help of examples various commomly used Asymptotic notations. [CO3]

OR

Find the Big-oh Notations for the following functions:-

(i) $F(n) = 6n^2+135$
(ii) $F(n) = 7n^2+8n+56$
(iii) $F(n) = n^4+35n^2+84$

Q. 5. Discuss any String matching Algorithm with illustrative example. [CO4]

OR

Write short note on:
(a) Depth First Search
(b) Topological Sort

Q. 6. What are P, NP, NP-Hard and NP- Complete problems? Explain by giving an example of each. [CO5]

OR

What are Approaximation Algorithms? Explain Approaximation Set Cover in detail.