SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

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

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

Reappear May 2018

Algorithm Analysis and Design

Subject Code:BTCS-503A

Batch:2015(Regular) onwards.

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 an algorithm and a program?
(b) What is Fractional Knapsack and how it is different from 0/1 Knapsack?
(c) What is Topological Sort?
(d) Write time complexity of Mergesort for all cases.
(e) What do you mean by Worst case Analysis?
(f) State Greedy Strategy.
(g) What is heap?
(h) What are Randomized algorithms? What are its advantages?
(i) What are the applications of Fast Fourier Transform(FFT) ?
(j) What is difference between Dijkstra and Bellman Ford Algorithms for solving single shortest path problem?

PART B **(5×8marks)**

Q. 2. What do you mean by an Algorithm? Write various steps for design and analysis of Algorithms. [CO1]

OR

Write an Algorithm for Quicksort and find its complexity.

Q. 3. What do you mean by dynamic programming? Explain with the help of suitable examples. [CO2]

OR

Define a minimum spanning tree. Explain Kruskal's algorithm to find minimum spanning tree.

Q. 4. Explain why we use Asymptotic notation. Also define the following notations in detail with example: [CO3]

(i) Big-oh
(ii) Omega
(iii) Theta

OR

Find the Big-oh Notations for the following functions:

(i) $F(n) = 7n^5+6n+5$

(ii) $F(n) = 4n^2+56$

(iii) $F(n) = 2n^4+3n+45$

Q. 5. State String Matching problem and Explain Knuth Marries Pratt Algorithm in detail with example.

OR

Describe in detail Breadth First Search Algorithm with example.

Q. 6. Write short note on following:

(a) Approximation algorithms for NP-Complete Problems.

(b) Properties of Classes P, NP, NP-Hard and NP- Complete

OR

Why we use Approximation Algorithms? Explain Approximation Vertex Cover in detail.