

**University Institute of Engineering & Technology**

*(Recognised Under Section 2(f) and 12B of UGC)*

**Kurukshetra University, Kurukshetra**

**TIME – 3 Hrs 15 Min**

**THEORY EXAMINATION – JAN 2021**

**B.TECH - CE**

**SEMESTER – V**

**M.M. -56**

**PAPER – PE-CS-T307**

**SUBJECT - ADVANCED ALGORITHMS**

**INSTRUCTIONS TO BE FOLLOWED**

- Allotted time for examination is 3 hours 15 minutes that includes time for downloading the question paper, writing answers, scanning of answer sheets and E-mailing the PDF files to the designated Email ID.
- For CSE-A Regular Students, the Email ID is:- [btech5thcsea@kuk.ac.in](mailto:btech5thcsea@kuk.ac.in)
- For CSE-B Regular Students, the Email ID is:- [btech5thcseb@kuk.ac.in](mailto:btech5thcseb@kuk.ac.in)
- The candidates will be required to attempt 75% of the question paper (maximum) by choosing to their any best questions accumulating 56 marks.
- The PDF files should be saved as Roll No. and Subject Code. Proper attention should be given while sending the email and in the subject line, the Roll Number and Subject Code should be mentioned.
- Maximum Page Limit should be 20 (Twenty) for attempting the question paper on A4 sheets which could be downloaded and printed from the sample sheets given in the Kurukshetra University Examination guidelines.
- Over-attemptation should be avoided.
- Handwriting should be neat and clean and diagrams should be clear and contrasted.
- The candidate should not write their Mobile No. otherwise Unfair Means Case will be made.
- While attempting the paper, the candidate will use blue/black pen only.
- Before attempting the paper, the candidate will ensure that he/she has downloaded the correct question paper. No complaint for attempting wrong question paper by the candidate will be entertained.
- Candidate must ensure that he/she has put his/her signature on each page of the answer sheet used by him/her. Answer sheet without the signature of the candidate will not be evaluated.

## PART-A

Q. No. – 1 Answer the following questions carrying one mark each. 15x1=15

(i)	The longest common subsequence of the sequences $X = \langle A, B, C, B, D, A, B \rangle$ and $Y = \langle B, D, C, A, B, A \rangle$ has length
(ii)	Match the following: 1. Matrix Chain Multiplication (a) Greedy Technique 2. N-Queen Problem (b) Dynamic Technique 3. Kruskal Algorithm (c) Backtracking Technique
(iii)	Worst Case time complexity of Longest common subsequences for a string of length n. (a) $O(2n)$ (b) $O(n(n-1))$ (c) $O(n \log n)$ (d) $O(2^n)$
(iv)	Dijkstra algorithm, which solves the single-source shortest paths problem, is a _____, and the Floyd-Warshall algorithm, which finds shortest paths between all pairs of vertices, is a _____.
(v)	Root of the Red-Black tree is always _____.
(vi)	Time complexity of Depth First Traversal of is (a) $\Theta( V + E )$ (b) $\Theta( V )$ (c) $\Theta( E )$ (d) $\Theta( V * E )$
(vii)	All NP-Complete problems are NP-Hard.(True/False)
(viii)	Which of the following algorithm can be designed with recursion – (a) Tower of Hanoi (b) Fibonacci series (c) Tree Traversal (d) All of the above
(ix)	DFS uses which data structure? (a) Stack (b) Queue.
(x)	If we choose Prim's Algorithm for uniquely weighted spanning tree instead of Kruskal's Algorithm, then (a) We'll get a different spanning tree. (b) We'll get the same spanning tree. (c) Spanning will have less edges. (d) Spanning will not cover all vertices.
(xi)	Which of the following algorithm is not in-place? (a) Heap sort (b) Insertion sort (c) Merge sort (d) Quick Sort
(xii)	The operation of processing each element in the list is known as (a) Sorting (b) Merging (c) Inserting (d) Traversal
(xiii)	Two main measures for the efficiency of an algorithm are (a) Processor and memory (b) Complexity and capacity (c) Time and space (d) Data and space
(xiv)	Which of the following sorting algorithm is of divide-and-conquer type? (a) Bubble sort (b) Insertion sort (c) Quick sort (d) All of above
(xv)	Given two vertices in a graph s and t, which of the two traversals (BFS and DFS) can be used to find if there is path from s to t? (a) Only BFS (b) Only DFS (c) Both BFS and DFS (d) Neither BFS nor DFS

## PART-B

2	Explain Master Theorem with suitable example.	5
3	Discuss Knapsack Problem.	5

4	Write and discuss the significance of Bellman-Ford Algorithm.	5
5	Discuss String matching with finite automata.	5

**PART-C**

6	What is the need of Algorithm Analysis (Worst, Best & Average case). Find the space complexity (all case) of any one sorting technique.	10
7	Discuss various Methods for solving Recurrence.	10
8	Write and discuss the role of Greedy Algorithm.	10
9	Define Hiring Problem. Discuss its probabilistic analysis	10
10	Differentiate Kruskal and Prim algorithms with example. Write Kruskal and Prim algorithm also.	10
11	Write and explain All pair shortest path-Floyd Warshall Algorithm.	10
12	Discuss various steps involved in Rabin-Karp Algorithm.	10
13	Write and explain Knuth-Morris-Pratt Algorithm.	10