Roll No.: .....

Total No. of Questions : 11] [Total No. of Printed Pages : 8

PK-423

M.Sc. II Semester Computer Science (Reg./ATKT) Examination June 2018

DATA STRUCTURE AND ALGORITHM

Paper - I

Time Allowed : Three Hours] *[Maximum Marks : 85*

Note : Attempt all questions.

Section - A
Objective Type Questions

Q.1. Choose the correct answers: 15×1=15

i) The logical or mathematical model of a particular organization of data is called a _____.

(a) Data structure

(b) ADT

(c) Information

(d) None of the above

ii) An m × n matrix is said to be _____ if many of its elements are zero.

(a) Sparse

(b) Square

(c) Unit

(d) None of the above

iii) The memory address of the _____ element of an array is called Base Address

(a) First

(b) Second

(c) Last

(d) None of the above

iv) Which data structure is needed to convert infix expression to postfix expression?

(a) Brach

(b) Queue

(c) Tree

(d) Stack

v) Which of the following is not an application of priority queue?

(a) Huffman codes

(b) Heap sort

(c) Machine Scheduling

(d) Quick sort

vi) _____ tree are commonly known as AVL Tree.

(a) Height Balanced Tree
(b) Red Black Tree
(c) B-Tree
(d) None of the above

vii) _____ are also called First-in-First out lists.

(a) Queues
(b) Stack
(c) Tree
(d) Graph

viii) A binary tree of height h, $h \geq 0$ has atleast _____ and at most $2^n - 1$ elements in it.

(a) $2h$
(b) h
(c) h^2
(d) $h - 1$

ix) A max heap is a max tree that is also a _____.

(a) Binary tree
(b) B - tree
(c) Complete binary tree
(d) Binary search tree

x) Which of the following problems should be solved using dynamic programming?

(a) Merge sort
(b) Binary search
(c) Longest common subsequence
(d) Quick sort

xi) A graph G(V, E) is said to be finite if it has a:

(a) Finite number of vertices
(b) Finite number of edges
(c) Both (a) and (b)
(d) None of them

xii) Kruskal algorithm is based on _____ method.

(a) Divide and Conquer method
(b) Greedy method
(c) Dynamic Programming
(d) Branch and Bound

xiii) A common way to select the next E-node in the branch and bound strategy is _____

(a) First In First Out (FIFO)
(b) Least Cost or Max Profit
(c) LIFO
(d) Both (a) and (b)

xiv) Which of the following is not a backtracking algorithm?

(a) Knight tour problem

(b) N-Queen problem

(c) Tower of Hanoi

(d) M coloring problem

xv) A Greedy algorithm can be used to solve all the dynamic programming problems

(a) True

(b) False

Section - B

Short Answer Type Questions

5×5=25

Q.2. Write a short note (any one):

a) Formula based representation

b) Simulating Pointers

Q.3. Explain Queue with their applications.

OR

What do you mean by Binary Tree? Explain their properties with proof.

Q.4. Write a short note (any one):

a) Winner Tree and Loser Tree

b) Priority Queue

Q.5. Explain Divide and Conquer method with suitable example?

OR

Explain Applications of graph.

Q.6. Distinguish between Dynamic Programming and Backtracking.

OR

Write applications of Backtracking?

Section - C

Long Answer Type Questions

5×9=45

Q.7. Define Array. Derive address calculation formula for 1D, 2D, 3D and N dimensional array.

OR

a) Explain convex hull with example.

b) Describe sparse matrices.

Q.8. What is Stack? What are their basic operations? Explain its applications?

OR

Explain Binary tree traversal methods with example.

Q.9. Define Binary search tree? Explain the procedure for deleting an item from a binary search tree with example.

OR

Explain Red Black tree and AVL Tree with example.

Q.10. Describe greedy method with their applications.

OR

Define Graph. What are the traversing methods used for Graph?

Q.11. Explain Branch and bound method with their applications.

OR

Describe dynamic programming and its applications.

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