901 - Data Structures & Algorithms

P. Pages : 1   **GUG/W/16/3812**

Time : Three Hours   \|\|\|\|\|\|\|\|\|\|\|\|\|\|\|\|\| Max. Marks : 70
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Notes : 1. All questions carry equal marks.
2. Answer **any five** questions.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) What is sub algorithm? Write a sub algorithm to find sum of N numbers. **6**

b) Explain OOPs with its features in detail. **8**

2. a) Write an algorithm to find largest and smallest element of a vector. **7**

b) Write an algorithm to find sum of all the elements of two dimensional array. **7**

3. a) Write a recursive sub algorithm to create a Fibonacci sequence upto n – terms. **8**

b) In reference to polish expressions explain, prefix and suffix form. How are they evaluated. Give examples. **6**

4. a) Write basic algorithms for management of Queue. **7**

b) Write an algorithm to convert unparenthesized infix expression into suffix form. **7**

5. a) Write an algorithm to insert from front in the Linked list. **8**

b) Explain the algorithm to obtain a new Node for linked list from its availability stack. **6**

6. a) For the following traversals, construct a binary tree

i)   Pre order - * 1 + b c ↑ e + f g

Post order a b c + * e f g + ↑ - **4**

ii)   In order 9 12 13 16 18 23 30 31 32 38 42

Pre order 23 12 9 16 13 18 32 31 30 42 38 **4**

b) Discuss trees, their representations and applications. **6**

7. a) Write an algorithm for Bubble sort. **8**

b) Simulate Binary search in the following sorted vector for 57 and 31. **6**
Vector :   11, 17, 21, 27, 31, 37, 47, 51, 57, 63, 70.

8. Write short notes on **any three.** **14**
i)   Merge Sort
ii)   Data Abstraction & Hiding in OOPs
iii)   Doubly Linked Lists.
iv)   Heap sort
v)   Classes and objects

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