U.G. 5th Semester Examination - 2021

COMPUTER SCIENCE

[PROGRAMME]

Discipline Specific Elective (DSE)

Course Code : COM.SC-G-DSE-L-501A

(Anlysis of Algorithms and Data Structures)

Full Marks : 40 Time : $2\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP-A

Answer any **five** questions: 2×5=10

1. a) Define big-O notation.

   b) What is algorithm?

   c) Define multi-dimensional array.

   d) What is the difference between linear and non-linear data structure?

   e) What is queue?

   f) How is an array different from linked list?

   g) Write the structure representing a node of linked list.

   h) What do you mean by circular link list?

GROUP-B

Answer any **two** questions: 5×2=10

2. a) What do you mean by time complexity and space complexity? What is recursion? 3+2

   b) Construct a Binary Search Tree with the following pre-order and in-order traversal: 5

   pre-order: A,B,C,D,E,F,G,H,I

   in-order: C,B,E,D,G,F,A,H,I

   c) Write an algorithm to insert a node into a linear inked list in memory. 5

   d) Write the working principle of selection sort algorithm. 5

GROUP-C

Answer any **two** questions: 10×2=20

3. a) Write the algorithm of insertion sort and apply this algorithm to sort the following elements: 3, 7, 4, 9, 5, 2, 6, 1

   b) Write the working principle of linear search.

   (5+3)+2

4. a) Explain the advantages and disadvantages of binary search over linear search.

b) Apply merge sort algorithm to sort the following elements:

38, 27, 43, 3, 9, 82, 10

3+7

5. a) Sort the following elements in ascending order using bubble sort:

65, 35, 95, 10, 50, 80, 12, 75, 8, 30

b) What is linked list? How binary search tree is represented in memory? 5+(2+3)

6. Write short notes (any **two**) : 5×2=10

a) Divide and conquer

b) Radix sort

c) Binary search

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