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Paper Code : BCAC303   Data Structure and Algorithm

Time Allotted : 3 Hours   *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer any ten of the following :   [1 x 10 = 10]
   - (I) What is the difference between a Stack and an Array?
   - (II) What are the disadvantages of Circular List?
   - (III) Which data structure is used to perform recursion?
   - (IV) Given a Tree, is it possible to find the greatest and least among leaves in linear time?
   - (V) Is it necessary to sort a File before searching a particular item ?
   - (VI) What is a Spanning Tree?
   - (VII) Is it possible to implement 2 stacks in an array?
     Condition: None of the stack should indicate an overflow until every slot of an array is used.
   - (VIII) How many stacks are required to implement a Queue.
   - (IX) Parenthesis is never required in Postfix or Prefix expressions. Why?
   - (X) What actions are performed when a function is called?
   - (XI) What do you mean by Free Pool?
   - (XII) What is Dangling Pointer and how to avoid It?

Group-B (Short Answer Type Question)
Answer any three of the following   [5 x 3 = 15]

2. Consider the following arithmetic expression P, written in postfix notation .   [5]
   P: 12,7,3 -/2,1,5+,*,+
   Translate P, into its equivalent infix expression .

3. Evaluate the postfix expression: [5]
   623+-382/+*2-3

4. Translate, by inspection and hand, each infix expression into its equivalent prefix expression.   [5]
   a) (A-B)*(D/E)
   b) (A +B d)/(E-F)+G

5. Write the structure of a node for linked implementation of a polynomial.   [5]

6. Write a short note on priority queue.   [5]

Group-C (Long Answer Type Question)
Answer any three of the following   [15 x 3 = 45]

7. (a) What is hashing ? How is collision problem solved in hashing?   [8]

   (b) What is recursion? How does it differ from iteration?   [7]

8. (a) Explain row major and column major representation of two dimensional array.   [5]

   (b) Consider an integer array of size 3X3. The address of the first element is 1048. Calculate the address of the element at index i = 2, j = 1. (0 based index)   [5]

   (c) Write a short note on sparse matrix.   [5]

9. (a) Convert the following infix expression to corresponding postfix expression: (A+B)/C*E+F $G-H/(I*J)   [5]

   (b) Write a program in Python/C to show the use of remove() and pop() function in an array.   [8]

   (c) What is the use of index() method in Python?   [2]

10. (a) Write the function for insertion operation of singly linked list.   [4]

    (b) Write a short note on circular linked list.   [5]

(c) Write a program in Python/ C to return the maximum and minimum number in a linked list. [6]

11. (a) How the doubly linked list can be represented? [2]

(b) Write a program in Python/ C to delete a given node in a doubly-linked list. [8]

(c) Where cursor implementation of list can be used? [5]

*** END OF PAPER ***