

Please check whether you have got the right question paper.

- N.B:
1. All question is compulsory.
  2. Figures to the right indicate full marks.
  3. Students answering in the regional language should refer in case of doubt to the main text of the paper in English.

**Q I. Attempt any FOUR of the following:****(20 Marks)**

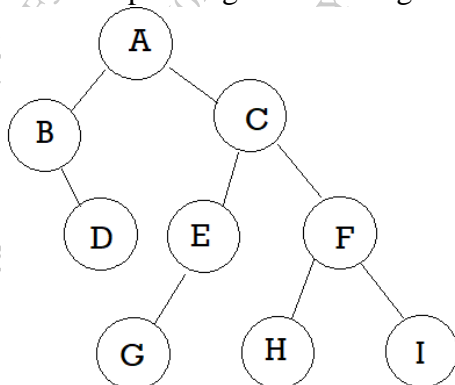
- a. Define ADT. Explain Bags ADT
- b. What is python set? List and explain any five functions of set.
- c. How to implement Multi Arrays ADT in data structure.
- d. Define Algorithm. List and explain different cases of Algorithm analysis.
- e. Sort the given set of numbers using bubble sorting:  
112, 45, 92, 315, 810, 63, 95  
Show step by step process
- f. Explain binary search technique with example.

**Q II. Attempt any FOUR of the following:****(20 Marks)**

- a. Define linked list. How is a linked list implemented?
- b. Write an algorithm to convert postfix to infix.
- c. Write a short note on circular lined list traversal.
- d. Convert the following infix expression into postfix.  
i)  $(a+b*c)-d$   
ii)  $(-a+b)-25/5*3+4$   
iii)  $(a/b*c)-56+12^2$
- e. Explain stack data structure with its application.
- f. How priority queue is implemented?

**Q III. Attempt any FOUR of the following:****(20 Marks)**

- a. Why does collision occur in Hash tables? Explain any one of the methods to solve it.
- b. Define search tree. Explain B-search tree with example.
- c. Define recursive function? List and explain its different properties.
- d. Explain Hashing linear probing.
- e. With respect to given tree diagram, answer the following:



- i. List path from A to H
- ii. What is the post-order traversal of tree
- iii. List all interior nodes
- iv. List all leaf nodes

- f. Explain in-order traversal with proper tree diagram

**Q IV. Attempt any THREE of the following:****(15 Marks)**

- a. What is difference between time and space complexity
- b. Write a short note on heaps and heapsort
- c. Write a python code to find execution time required to check whether a number is

Armstrong number or not.

- d. Write a note on runtime stack
- e. What is an iterator? Explain its use
- f. What are trees? State and explain the properties of trees.

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