

Q.P. Code :04510

[Time:  $2\frac{1}{2}$  Hours]

[Marks:75]

Please check whether you have got the right question paper.

- N.B:
1. All questions are compulsory.
  2. Figures to the right indicate marks.
  3. Illustrations, in depth answers & diagrams will be appreciated.
  4. Mixing of sub questions is not allowed.



Q.1 Attempt all (each of 5 marks)

15

- a) Select appropriate choice from the following.
- i) Array in python is:
    - a) Data type
    - b) Advanced data type
    - c) Abstract data type
    - d) None of these
  - ii) Stack is also known as:
    - a) FIFO Structure
    - b) LIFO Structure
    - c) Both a & b
    - d) None of these
  - iii) Singly linked list allows traversal in.
    - a) Forward direction
    - b) Back ward direction
    - c) Both a & b
    - d) None of these
  - iv) The method which removes last element from python list is
    - a) Delete ( )
    - b) Remove ( )
    - c) Pop ( )
    - d) All a, b, & c
  - v) The set operation which performs finding common between 2 sets is.
    - a) Union
    - b) Intersection
    - c) Subset
    - d) Superset
- b) Fill in the blanks.
- i) Full form of ADT is \_\_\_\_\_
  - ii) The entry point queue is called \_\_\_\_\_ & exit is called as \_\_\_\_\_.
  - iii) The function which calls itself is \_\_\_\_\_ function.
  - iv) When last node of linked list point to first node, the list is called as \_\_\_\_\_.
  - v) The depth of tree is simply number of \_\_\_\_\_ in tree.

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c) Short answers.

- i) Define data structure.
- ii) State the factors used for algorithm analysis.
- iii) Which ADT is used in solving polynomial expressions?
- iv) Define tree.
- v) Define Hashing.

Q.2 Attempt the following (Any Three)

15

- a) What is ADT? Discuss its advantages.
- b) Write a program to read 10 numbers & then search whether 55 exist in that list.
- c) Suppose set is implemented by using python list, define is subset (set B) method to decide whether B is subset.
- d) How array differs from python list?
- e) Write note on Algorithm analysis.
- f) Explain binary search technique with example.

Q.3 Attempt the following (Any Three)

15

- a) Explain prepending operation on singly linked list.
- b) Consider stack 'STK' is empty. After performing each of the following operation, draw the status of 'STK' with its contents & Top position.
  - i) STK. push (100)
  - ii) STK. push (150)
  - iii) STK. pop ( )
  - iv) STK. pop ( )
  - v) STK. push (200)
- c) Write a program to implement queue using python list.
- d) Explain the concept of doubly linked list with example.
- e) Define node for singly linked list & define function to traverse list.
- f) Explain why one should use linked list when list in python is available?

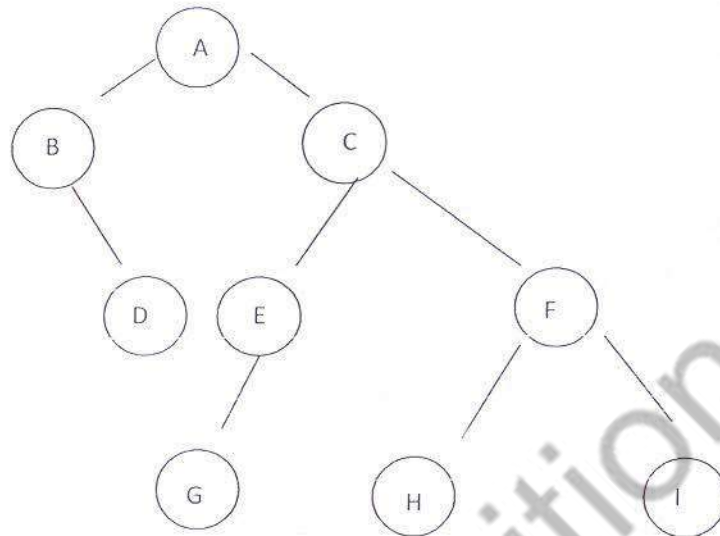
Q.4 Attempt the following (Any Three)

15

- a) Explain working of recursive operation.
- b) Write a note on hash function.
- c) Explain the procedure of merge sort.

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d) With respect to given tree diagram answer following.



- i) List path from A to H
- ii) What is the postorder traversal of tree
- iii) List all interior nodes
- iv) List all leaf nodes
- v) Is it binary tree? Why?
- e) How to construct expression tree? Give example.
- f) Explain inorder traversal with proper tree diagram.

Q.5 Attempt the following (Any Three)

15

- a) explain efficiency analysis for operations on list such as append & extend.
- b) Write a program to read 5 names & display them in alphabetic order.
- c) Convert following expression into postfix form.
  - i)  $(X*Y)/Z$
  - ii)  $A + B * (C-D)/E$
  - iii)  $H/i*j-k+m$
- d) What is iterator? Explain its use.
- e) State & explain properties of tree.