

# END TERM EXAMINATION

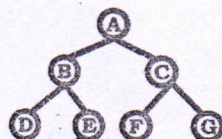
SECOND SEMESTER [BCA] MAY-JUNE-2013

Paper Code: BCA108 Subject: Data Structures using 'C' (New)

Time : 3 Hours Maximum Marks :75

Note: Attempt all questions. Internal choice is indicated.

- Q.1. Attempt all parts of the following:-
- (a) Define Data Structure and also write down the difference between primitive data structure and non-primitive data structure. (4)
  - (b) Difference between malloc and calloc functions. (4)
  - (c) What are the uses of header node in a linked list? (2)
  - (d) What is hash function? (2)
  - (e) Define a
    - (i) Binary Tree
    - (ii) Complete Binary Tree
    - (iii) Height balanced trees
 (3)
- Q.2. Attempt any one part of the following:-
- (a) (i) Write an algorithm to insert and delete an item into/from a doubly linked list. Consider all the possible cases. (7)
  - (ii) Write the functions for insertion and deletion operations performed in the DEQUE. Consider all the possible cases. (8)
  - (b) (i) Write an algorithm for insertion and deletion in a Queue using pointers. (7)
  - (ii) Write an algorithm to inserting a new node at the specified position and deleting the node from specified position in the linked list. (8)
- Q.3. Attempt any one part of the following:-
- (a) (i) Write an algorithm for merge sorting on an numbers. Show various stages in merge sorting over the data: 11, 2, 9, 13, 57, 25, 17, 1, 90, 3. (8)
  - (ii) Write an algorithm for selection sorting on a numbers. Show various stages in selection sorting over the data: 25, 17, 31, 13, 2. (7)
  - (b) (i) Write an algorithm for insertion sorting on a numbers. Show various stages in insertion sorting over the data: 25, 17, 31, 13, 2. (8)
  - (ii) What is hashing? Explain it. (7)
- Q.4. Attempt any one part of the following:-
- (a) (i) Write an algorithm for inserting an item into the Stack and deleting an item from the Stack. (7)
  - (ii) Convert the following expression from infix to postfix:
    - 1)  $A*B+C/D$
    - 2)  $A+B/C-D$
    - 3)  $(A+B)/(C-D)$
    - 4)  $A+(B*C-(D/E^F)*G)*H$  (8)
  - (b) (i) Write an algorithm for converting Infix expression to Postfix form in the stack. (7)
  - (ii) Evaluate Postfix form:
    - 1)  $5\ 9\ 8\ +\ 4\ 6\ *\ +\ 7\ -\ *$
    - 2)  $4\ 2\ \$\ 3\ *\ 3\ -\ 8\ 4\ /\ 1\ 1\ +\ /\ +$  (8)
- Q.5. Attempt any one part of the following:-
- (a) (i) Write an algorithm to insertion and deletion of a node into/from a Binary Search Tree. (9)
  - (ii) Traverse the following tree in Pre-order and Post order traversal.



- (b) (i) Create a B tree of order 5 on inserting the keys 10, 20, 50, 60, 40, 80, 100, 70, 130, 90, 30, 120, 140, 25, 35, 160, 180, inserted in left to right sequence. Show the trees on deleting 190 and 60. (8)
- (ii) What is AVL Tree? Write down an algorithm of AVL Tree (7)