Voc(Sem-V) —
BCA (CC – 11)

2023

Time : 3 hours

Full Marks : 50

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

The figures in the margin indicate full marks.

Answer from **all** the Sections as directed.

Section – A

1. Choose the correct answer from given options :

1×5 = 5

(a) Which one of the following is the size of int arr [9] assuming that int is of 4 bytes ?

(i) 36   (ii) 18

(iii) 9   (iv) 10

(b). Which data structure is mainly used for implementing the recursive algorithm ?

(i) Queue   (ii) Stack

(iii) Binary tree   (iv) Linked list

       (Turn over)

(c) If the elements '1', '2', '3' and '4' are added in a stack, so what would be the order for the removal ?

(i) 1 2 3 4   (ii) 4 3 2 1

(iii) 4 3 1 2   (iv) 4 1 2 3

(d) In the linked list implementation of queue, where will the new element be inserted ?

(i) At the middle position of the linked list

(ii) At the head position of the linked list

(iii) At the tail position of the linked list

(iv) None of these

(e) Consider the implementation of the singly linked list having the head pointer only in the representation. Which of the following operations can be performed in O(1) time ?

(i) Deletion of the last node in the linked list

(ii) Insertion at the front of the linked list

(iii) Deletion of the first node in the linked list

(iv) Insertion at the end of the linked list

2. Fill in the blanks of the following : 1×5 = 5

(a) If the size of the stack is 10 and we try to add the 11th element in the stack then the condition is known as _____.

(b) A linear data structure in which insertion and deletion operations can be performed from both the ends is _____.

(c) In an AVL tree insertion process _____ and _____ rotations are double rotations.

(d) The _____ of tree is the total number of edges from root to the farthest leaf node.

(e) To create a node dynamically, the statement is ptr = (struct node*)malloc(sizeof(_____)).

Section – B

2. Answer any **four** questions of the following :

3×4 = 12

(a) Write an algorithm to traverse a binary search tree in pre-order.

(b) Distinguish between complete binary tree and full binary tree.

(c) Evaluate the following postfix expression using stack :

8 2 3 ^ / 2 3 * + 5 1 * −

(d) What are the postfix and prefix forms of the expression :

$$A + (B * C - D / E \wedge F) * G) * H$$

(e) What is sparse matrix ? How it can be represented using an array ? Give an example.

(f) Describe row major order and column major order representation of 2-D array.

Section – C

3. Answer any **four** questions of the following :

$$7 \times 4 = 28$$

(a) Create a B-tree using the following data :

16, 20, 22, 42, 12, 30, 32, 18, 10, 34, 36, 38, 14, 24, 28, 40, 26

(b) Write a C program to perform heap sort.

(c) Write an algorithm to insert a node after given node number in linear linked list.

(d) Write an algorithm to create a node in the circular linked list.

(e) Write a C program to perform push and pop operation in a stack using linked list.

(f) Write an algorithm to evaluate any postfix expression.

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