(Pages : 3)

Name..................... 24

Reg. No.....................

THIRD SEMESTER B.C.A. DEGREE EXAMINATION, NOVEMBER 2015

(CUCBCSS – UG)

Core Course

BCA 3B 04—DATA STRUCTURES USING C++

Time : Three Hours

Maximum : 80 Marks

Part A

Answer **all** *questions.*

Each question carries 1 mark.

1. The number of elements in an array a[l :u] could be determined by :

   (a) $(u + l + 1)$.

   (b) $(u + l + 2)$.

   (c) $(u - l + 1)$.

   (d) $(u - l + 2)$.

2. Sparse matrices have :

   (a)   No zero.

   (b)   Many zeroes.

   (c)   Higher dimension.

   (d)   None of the above.

3. Which of the following data structure can't store the non-homogenous data elements :

   (a)   Records.

   (b)   Arrays.

   (c)   Files.

   (d)   Linked lists.

4. A data structure where elements can be added or removed at either end but not in the middle :

   (a)   Stack.

   (b)   Queue.

   (c)   Linked list.

   (d)   Deque.

5. Which of the following is a two-way list :

   (a)   Singly linked list.

   (b)   Circular list.

   (c)   Linked list with head node.

   (d)   None of the above.

6. Node which is of degree zero is called :

   (a)   Root node.

   (b)   Terminal node.

   (c)   Non-terminal node.

   (d)   None of the above.

7. You can remove an element from a queue's —————.

   (a)   Top.

   (b)   Front.

   (c)   Bottom.

   (d)   Rear.

Turn over

8. The maximum number of nodes in a binary tree of depth k is :

    (a) $2^k - 1$.

    (b) 2^{k-1}.

    (c) $2 * (k - 1)$.

    (d) 2^{k-2}.

9. Which of the following is useful in traversing a graph in breadth first search :

    (a) Stack.

    (b) Queue.

    (c) Linked list.

    (d) Tree.

10. Adjacency lists are used for ————.

    (a) Stack representation.

    (b) Queue representation.

    (c) Graph representation.

    (d) Array representation.

(10 × 1 = 10 marks)

Part B

Answer all questions.
Each question carries 2 marks.

11. What is an abstract data type ?

12. What is time complexity ?

13. Discuss about pointer arrays.

14. What are the applications of queues ?

15. Discuss indexed searching.

(5 × 2 = 10 marks)

Part C

Answer any five questions.
Each question carries 4 marks.

16. Discuss the various approaches to algorithm design.

17. Explain recursion with an example.

18. Discuss array as an abstract data type.

19. Explain the way to represent a sparse matrix using arrays.

20. What is a queue ? What are its applications ?

21. Explain the bubble sort technique.

22. Describe the different methods to represent binary tree in memory.

23. Explain binary search.

(5 × 4 = 20 marks)

Part D

Answer any five questions.
Each question carries 8 marks.

24. What is an algorithm ? Explain the performance analysis of algorithms.

25. Differentiate between static and dynamic data structures.

26. What is an array data structure ? Explain the representation of arrays in memory.

27. What is a stack ? Write a program to implement a stack using array.

28. What is a circular queue ? Write the algorithms for insertion and deletion operations on a circular queue.

29. Discuss the application of graph structures. What are the different methods to traverse graphs ?

30. Write a program to implement heap sort. Explain.

31. What is hashing ? Explain the different hash functions.

$(5 \times 8 = 40 \text{ marks})$