

Roll No. 209510

[Total No. of Pages : 10]

BCA-204

B.C.A. Second Year Examination, 2014

B.C.A.

PAPER—IV

(Data Structures Using C)

Maximum Marks : 100

SECTION-A

खण्ड-अ

Marks : 50

Time : 1½ Hours

Candidates are required to first answer the Section-A (Multiple Choice Questions) by marking correct choice on OMR Sheet in prescribed time. All questions are compulsory and carry equal marks. There is no negative marking for wrong answers.

सर्वप्रथम खण्ड-अ के सभी वस्तुनिष्ठ प्रश्नों के उत्तर ओ.एम.आर. शीट में परीक्षार्थियों को निश्चित समय में देने हैं। सभी प्रश्न अनिवार्य एवं समान अंक के हैं। गलत उत्तर का ऋणात्मक मूल्यांकन नहीं किया जाएगा।

SECTION-B

खण्ड-ब

Marks : 50

Time : 1½ Hours

After depositing OMR Sheet of Section-A with invigilator, the candidates are required to answer one question from each Unit (each question in 250 words) in a separate Answer-book provided to them. All questions carry equal marks.

खण्ड-अ की ओ.एम.आर. शीट पर्यवेक्षक को जमा कराने के पश्चात परीक्षार्थी खण्ड-ब की प्रत्येक इकाई से एक प्रश्न का उत्तर दी गई उत्तर-पुस्तिका में देंगे। प्रत्येक प्रश्न का उत्तर लगभग 250 शब्दों में दिया जाना है एवं सभी प्रश्नों के अंक समान हैं।

BCA-204

P. T. O.

SECTION-A

खण्ड-अ

Marks : 50

Time : 1½ Hours

Candidates are required to first answer the Section-A (Multiple Choice Questions) by marking correct choice on OMR Sheet in prescribed time. All questions are compulsory and carry equal marks. There is no negative marking for wrong answers.

सर्वप्रथम खण्ड-अ के सभी वस्तुनिष्ठ प्रश्नों के उत्तर ओ.एम.आर. शीट में परीक्षार्थियों को निश्चित समय में देने हैं। सभी प्रश्न अनिवार्य एवं समान अंक के हैं। गलत उत्तर का ऋणात्मक मूल्यांकन नहीं किया जाएगा।

UNIT-I

1. Data structure required to evaluate prefix expressions is

- (A) Array
- (B) Queue
- (C) Stack
- (D) Linked List

2. Queue can be used to implement following

- (A) Quick sort
- (B) Radix sort
- (C) Recursion
- (D) Depth First Search

3. Which of the following data structure can't store the non-homogeneous data elements?

- (A) Arrays
- (B) Records
- (C) Pointers
- (D) None of the above

4. If the sequence of operations - Push(10), Push(20), Pop, Push(10), Push (20), Pop, Pop, Pop, Push(20), Pop are performed on stack, the sequence of popped out values are

- (A) 20 20 10 20 20
- (B) 20 20 10 10 20
- (C) 20 10 20 20 10
- (D) 20 10 20 20 20

5. Arrays are best data structures

- (A) for relatively permanent collections of data
- (B) for the size of the structure and the data in the structure are constantly changing
- (C) for both of above situation
- (D) for none of above situation

6. The postfix expression for $*+AB - CD$

- (A) $A B C D + - *$
- (B) $A B + C D - *$
- (C) $A B + C D - *$
- (D) $A B + - C D *$

7. The complexity of multiplying two matrices of order $m*n$ and $n*p$ is

- (A) mnp
- (B) mp
- (C) mn
- (D) np

8. The condition to test if a queue is empty

- (A) $rear=0$ and $front=0$
- (B) $front=-1$
- (C) $front=-1$ and $rear=-1$
- (D) $rear=-1$

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

- (A) Linked lists
- (B) Stacks
- (C) Queues
- (D) Deque

10. What condition is tested to check if a circular queue is full, assuming the size of the queue is denoted by N

- (A) $(Rear+1)\%N=front$
- (B) $front+1=rear$
- (C) $front=rear$
- (D) $rear+1=front$

UNIT-II

11. To de-allocate a node, which of the following function is used

- (A) $alloc();$
- (B) $free();$
- (C) $new();$
- (D) $malloc();$

12. Which of the following is two-way list?

- (A) grounded header list
- (B) circular header list
- (C) linked list with header and trailer nodes
- (D) None of the above

13. The situation when in a linked list $START=NULL$ is

- (A) underflow
- (B) overflow
- (C) housefull
- (D) saturated

14. The disadvantage in using a circular linked list is
- (A) Last node points to first node
 - (B) Time consuming
 - (C) It is possible to get into infinite loop
 - (D) Requires more memory space
15. Which list is most reliable
- (A) Singly
 - (B) Doubly
 - (C) Circular
 - (D) None of the above
16. A list which displays the relationship of adjacency between elements is said to be
- (A) Linear
 - (B) Non Linear
 - (C) Link List
 - (D) Tree
17. If address of the 8th element is a linked of integers is 1022, then address of 9th elements is
- (A) 1024
 - (B) 1026
 - (C) 1028
 - (D) None of the above
18. To delete a node from a linked list, the function used is
- (A) free();
 - (B) delete();
 - (C) destory();
 - (D) pop();
19. Which of the following is true
- (A) Linked list is never full
 - (B) Insertion in linked list takes more time than in array
 - (C) Linked list need not be initiatilized
 - (D) None of these
20. Type of pointer returned by malloc function is
- (A) int
 - (B) char
 - (C) void
 - (D) type of structure passed as argument

UNIT-III

21. A Binary tree that has n leaf nodes, the number of nodes of degree 2 in this Tree is?
- (A) $\log_2 n$
 - (B) $n-1$
 - (C) n
 - (D) 2^n

22. Which of the following is true?

- (A) Tree is a linear data structure
- (B) Tree is a static data structure
- (C) ✓ Tree represents parent-Child hierarchy
- (D) Tree represents many to many relationship

23. The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal

- (A) ABFCDE
- (B) ADBFEC
- (C) ABDECF
- (D) ✓ ABDCEF

24. A connected graph T without any cycles is called

- (A) a tree graph
- (B) free tree
- (C) a tree
- (D) ✓ All of the above

25. In a tree, if a node can have 6 children, the degree is

- (A) 2^6
- (B) $2*6$
- (C) 2
- (D) ✓ 6

26. If there is only one node in a tree, the level is

- (A) 0
- (B) -1
- (C) ✓ 1
- (D) 2

27. The degree of a binary search tree is

- (A) 0
- (B) 1
- (C) ✓ 2
- (D) No Limit

28. If a node having two children is deleted from a binary tree, it is replaced by its

- (A) Inorder predecessor
- (B) ✓ Inorder successor
- (C) Preorder predecessor
- (D) None of the above

29. The in order traversal of tree will yield a sorted listing of elements of tree in

- (A) ✓ Binary trees
- (B) Binary Search trees
- (C) Heaps
- (D) None of the above

30. A full binary tree with $2n+1$ nodes contain

- (A) n leaf nodes
- (B) n non-leaf nodes
- (C) $n-1$ leaf nodes
- (D) $n-1$ non-leaf nodes

UNIT-IV

31. The depth of a complete binary tree is given by

- (A) $D_n = n \log_2 n$
- (B) $D_n = n \log_2 n + 1$
- (C) $D_n = \log_2 n$
- (D) $D_n = \log_2 n + 1$

32. The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal

- (A) ABFCDE
- (B) ADBFEC
- (C) ABDECF
- (D) ABDCEF

33. To traverse a graph using Breadth First search is used

- (A) Stack
- (B) Set
- (C) List
- (D) Queue

34. The maximum degree of any vertex in a simple graph with n vertices is

- (A) n
- (B) $n-1$
- (C) $n+1$
- (D) $2n-1$

35. An adjacency matrix representation of a graph cannot contain information of

- (A) nodes
- (B) edges
- (C) direction of edges
- (D) parallel edges

36. A node of a directed graph G having no out-degree and a positive in-degree is called

- (A) Source node
- (B) Sink node
- (C) Sibling node
- (D) Null node

37. The number of loop(s) of a node in a simple graph of ' N ' nodes is

- (A) One
- (B) N
- (C) Zero
- (D) Exactly two

SECTION-B

38. There exists an edge between every pair of vertices in a graph, such graph is called

- (A) Complete
- (B) Connected
- (C) Direct
- (D) Cyclic

39. The minimum number of colours needed to colour a graph having $n > 3$ vertices and two edges is

- (A) 1
- (B) 2
- (C) 3
- (D) 4

40. In a graph, which of the following algorithms does determine the reach ability of all node pairs?

- (A) Floyd's algorithm
- (B) Warshall's algorithm
- (C) Kruskal's algorithm
- (D) Prim's algorithm

UNIT-V

41. Which of the following is not the required condition for Binary Search Algorithm?

- (A) The list must be sorted
- (B) There should be the direct access to the middle element in any sublist

(C) There must be mechanism to delete and/or insert elements in list

(D) None of the above

42. In a graph if $e = (u, v)$ means

(A) u is adjacent to v but v is not adjacent to u

(B) e begins at u and end at v

(C) u is node and v is an edge

(D) both u and v are edges

43. Two main measures for the efficiency of an algorithm are

(A) processor and memory

(B) complexity and capacity

(C) time and space

(D) data and space

44. Which of the following case does not exist in complexity theory?

(A) Best Case

(B) Worst Case

(C) Average Case

(D) Null Case

45. A technique for direct search is

(A) Binary search

(B) Linear search

(C) Tree search

(D) Hashing

46. Recursive algorithms are based on

- (A) Divide and conquer approach
- (B) Top-down approach
- (C) Bottom-up approach
- (D) Hierarchical approach

47. The complexity of Bubble sort algorithm is

- (A) $O(n)$
- (B) $O(\log n)$
- (C) $O(n^2)$
- (D) $O(n \log n)$

48. Which of the following sorting algorithm is of divide-and-conquer type?

- (A) Bubble sort
- (B) Insertion sort
- (C) Quick sort
- (D) All of the above

49. Each set of names which are hashed into the same value is called

- (A) equivalence class
- (B) hash class
- (C) equal class
- (D) equivalent class

50. Binary Search algorithm cannot be applied to

- (A) Sorted Binary Trees
- (B) Sorted Linked List
- (C) Sorted Linear Array
- (D) Pointer Array

SECTION-B

खण्ड-ब

Marks : 50

Time : 1½ Hours

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UNIT-I

1. (a) Explain Data structure classification with examples.
(b) Write an algorithm for implementing enqueue and Dequeue operations.
2. (a) What is the difference between Stack and Queue?
(b) Discuss the advantages and disadvantages of Circular Queue, give its applications.

UNIT-II

3. (a) Differentiate between Array and Link List.
(b) Write an algorithm to insert a node at middle in Link List.
4. (a) What is Doubly Linked List?
(b) Explain algorithm for traversing a Doubly Linked List.

UNIT-III

5. Write an algorithm for Preorder, inorder and Postorder traversals of binary search tree.
6. Write an algorithm to create and display the nodes in a Binary Search Tree.

UNIT-IV

7. Explain Linear and Non linear graph representations by taking suitable example.
8. Explain the following :
 - (a) ✓ Dijkstra's algorithm for shortest path.
 - (b) ✓ Transitive closure.

UNIT-V

9. ✓ Explain algorithm for Merge sort.
10. ✓ Explain algorithm for Insertion sort.