CS/BCA/SEM-3/BCA-302/2011-1

2011

DATA STRUCTURE WITH C

Time Allotted: 3 Hours

Full Marks: 70

The figures in the margin indicate full marks.

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

GROUP - A (Multiple Choice Type Questions)

1. Choose the correct alternatives for any ten of the following:

 $10 \times 1 = 10$

i) Let q be the queue of integers defined as follows:

```
#define MAX10
struct queue;
{ int data [MAX];
   int rear, front;
} q;
```

To insert an element into the queue, we may write operation

- a) ++q.data[q.rear]=x;
- b) q.data[q.rear]++=x;
- c) q.data[++q.rear]=x;
- d) none of these.
- ii) The tree traversal technique in which the root is traversed after its children is known as
 - a) post-order traversal b) pre-order traversal
 - c) in-order traversal d) none of these.

4 * * \	Number of possible binary tree with 4 node is					
iii)				34		
	a)	14	b)	none of these.		
	c)	24	*			
iv)	Number of nodes in a complete binary tree of depth k is					
	a)	2k	b)	2^k		
	c)	2 ^k - 1	d)	none of these		
∜)	The	best case complexity of	inser	tion sort is		
	a)	$O(n^2)$	b)	$O(\log n)$		
	c)	O(n)	d)	$O(n \log n)$.		
vi)	Graph is a					
	a)	linear data structure				
	b)	non-linear data struct	ure			
	c)	either (a) or (b) depend	ling o	on situation		
	d)	none of these.				
vii)	Sta	ck works on				
	a)	LIFO	b)	FIFO		
	c)	both (a) and (b)	d)	none of these.		
viii)	A li	nked list follows		,		
	a)	random access mecha	mism	l.		
	b)	sequential access med	chani	sm		
	c)	no access mechanism				
	d)	none of these.				
ix)	x) The best data structure to see whether a expression has balanced parenthesis is a			e whether an arithmetic hesis is a		
	a)	stack	b)			
	c}	tree	d)	list.		
x) The total number of comparisons in bubble sort				ns in bubble sort is		
,	a)	$O(n \log 2^n)$		O(2n)		
	c)	$O(n^2)$	d)	$O(2^n)$.		
	,					

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- xi) The sparse matrix is a matrix whose
 - a) most of the elements are non-zero
 - b) half of the elements are zero and half of the elements are non-zero
 - c) most of the elements are zero
 - d) none of these.
- xii) The prefix notation is also known as
 - a) reverse notation
- b) reverse polish notation
- c) polish notation
- d) none of these.

GROUP - B

(Short Answer Type Questions)

Answer any three of the following

 $3 \times 5 = 15$

- What is Data structure? What is ADT? Explain with an example.
- 3. What is circular queue ? How is it different from queue ? What advantage do we get from circular queue over ordinary queue?
- 4. Convert the following infix expression into postfix form by using stack:

$$a + b * c - (d - e * f) / g$$

- 5. What is Linked List? What are its advantages over array?
 What are its disadvantages over array?
 1+2+2
- 6. Distinguish between DFS and BFS. Indicate their time complexities. 4+1

GROUP - C

(Long Answer Type Questions)

Answer any three of the following.

 $3\times15=45$

7. a) What is binary search tree?

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b) Construct the binary search tree if the elements are in the order:

60, 75, 25, 66, 50, 55, 45, 40, 35, 57, 30

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	c)	Delete the following nodes in order and show each	step			
		i) Node with 55	~~ <u>~</u> ~			
		ii) Node with 66				
		iii) Node with 50.	3 + 3			
8.	Wr	ite short notes on any three of the following:	3 × 5			
	a)	De-queue				
	b)	Non-linear data structure				
	c)	Hashing				
	d)	Priority queue.	· d			
9.	a)	Define General tree. Write an algorithm to convert a General tree into a binary tree.				
	b)	Define B-tree. Construct a B-tree of order 5 from following key values:	n the			
		a, g, f, b, k, d, h, m, j, e, s, i, r, x, c, l, n, t, u, p.				
		Also delete h, r, p, d.	8			
10.	Wri	te the functions of the following :				
	a)	Insert a node after a particular node in a Single Li List.	inked 5			
	b)	Reverse display of the list elements in a Doubly Linked List.				
	c)	Physically reverse the Single Linked List.	5			
11.	a)	Write a C function for selection sort.	6			
	b)	How does binary search give benefit over seque search?	ential 3			
	c)	Explain the divide and conquer rule with example.	6			
		Which shows same tribute taking same good organ same same same tribute same taking same Through same same supple same same same same same taking same taking same same same same same same same same				