

Reg.No. _____

**Karunya UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Nov/Dec – 2016

Code : 14CS2009
Sub. Name : Data Structures

Semester : 2016-17 ODD
Duration : 3hrs
Max. marks : 100

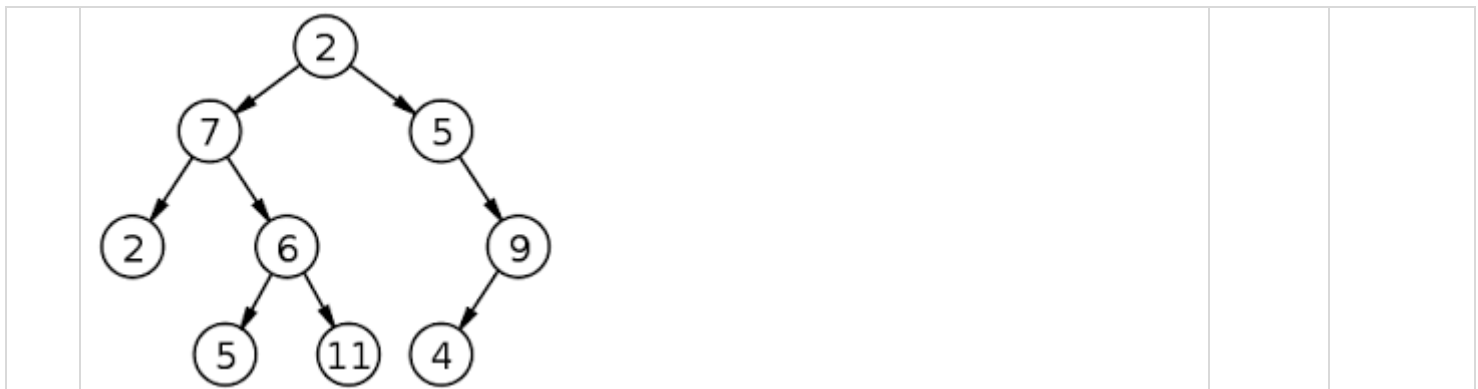
Q. No.	Questions	Course outcome	Marks
PART-A (40X1=40 MULTIPLE CHOICE QUESTIONS)			
1.	Stack may be represented in the computer usually by means of a one way list or a _____?		
	a. Queue b. Linear array c. Recursion d. Polish notation		(1)
2.	Which of the following is essential for converting an infix expression to the postfix form efficiently?		
	a. operator stack b. operand stack c. Both a&b d. None of these		(1)
3.	Consider a Stack implemented in C using array. <pre>#define MAX 10 struct STACK { int arr[MAX]; int top = -1; }</pre> In this implementation of stack maximum value of top which cannot cause overflow will be _____		
	a. 9 b. 10 c. 11 d. None of these		(1)
4.	Stack data structure cannot be used for _____		
	a. Reverse a string b. Implementation of recursion c. Evaluation of expression in postfix form d. Allocating Resources and Scheduling		(1)
5.	Which of the following data structure is non linear type?		
	a. Stack b. Queue c. List d. None of these		(1)
6.	For transferring 4 disks from source to destination pole in Tower of Hanoi problem, how many disk movements are needed?		
	a. 16 b. 17 c. 18 d. 15		(1)
7.	Recursion cannot be implemented in programming languages if _____ data structure is not there.		
	a. Array b. Queue c. Stack d. List		(1)
8.	Postfix form of the infix expression $A+B*C$ is _____		
	a. $AB+C*$ b. $ABC*+$ c. $AB*C+$ d. $ABC+*$		(1)
9.	In a circular linked list organization, insertion of a record involves the modification of _____		
	a. 1 Pointer b. 2 Pointers c. 3 Pointers d. No Pointer		(1)
10.	The process of accessing data stored in a tape is similar to manipulating data on a _____		
	a. Stack b. Queue c. List d. Heap		(1)
11.	Items in a priority queue are entered in a _____ order.		
	a. Random b. Order of Priority c. FIFO d. LIFO		(1)

12.	If the characters 'D', 'C', 'B', 'A' are placed in a queue (in that order), and then removed one at a time, in what order will they be removed?					
	a. ABCD	b. DCBA	c. DBAC	d. ABDC		(1)
13.	I have implemented the queue with a circular array, keeping track of first, last, and count (the number of items in the array). Suppose first is zero, and last is CAPACITY-1. What can you tell me about count?					
	a. Count must be zero.	b. Count must be CAPACITY.	c. Both a&b	d. None of these		(1)
14.	Which of the following data structure can be traversed in both directions ie. from start to end as well as in reverse direction?					
	a. Stack	b. Queue	c. Linked List	d. Doubly linked list		(1)
15.	Which of the following is not a type of linked list?					
	a. Linked List	b. Circular Linkly List	c. Circular Doubly Linked List	d. Hybrid Linked List		(1)
16.	Each Node in a linked list contain minimum two fields, one field is called data field to store data and another field is of type _____					
	a. Pointer to an integer	b. Pointer to node	c. Pointer to character	d. Pointer to pointer		(1)
17.	The Worst case occur in linear search algorithm when					
	a. Item is the last element in the array or is not there at all	b. Item is somewhere in the middle of the array	c. Item is not in the array at all	d. Item is the last element in the array		(1)
18.	The complexity of linear search algorithm is					
	a. O(n)	b. O(n log n)	c. O(n ²)	d. O(log n)		(1)
19.	The running time of quick sort largely depends on					
	a. Number of inputs	b. Size of elements	c. Arrangement of elements	d. Selection of pivot element		(1)
20.	As part of maintenance work, you are entrusted with the work of rearranging the library books in a shelf in proper order, at the end of each day. The ideal choice will be _____?					
	a. Quick Sort	b. Bubble Sort	c. Selection Sort	d. Insertion Sort		(1)
21.	Give the number of swaps needed to sort the numbers 8,7,6,5,4,3,2,1 in ascending order using Bubble Sort?					
	a. 20	b. 23	c. 25	d. 28		(1)
22.	A hash function f is defined as f(key) = key mod 7, with linear probing is used to insert the keys 8, 11, 14, 23 into a table indexed from 0 to 6. What will be the location of key 11?					
	a. 2	b. 3	c. 4	d. 5		(1)
23.	Which of the sorting algorithm has the worst case time complexity of n log n ?					
	a. Quick Sort	b. Heap Sort	c. Insertion Sort	d. Selection Sort		(1)
24.	Consider a binary max-heap implemented using an array. Which one of the following array represents a binary max-heap?					
	a. {25, 12, 16, 13, 10, 8, 14}	b. {25, 14, 13, 16, 10, 8, 12}	c. {25, 14, 16, 13, 10, 8, 12}	d. {25, 14, 12, 13, 10, 8, 16}		(1)
25.	Which of the following data structure is non-linear type?					
	a. Stack	b. Queue	c. Array	d. Tree		(1)
26.	The balance factor for an AVL tree is either					
	a. -2 or -1	b. 0, 1 or -1	c. 0, 1 or 2	d. -2, 0 or 1		(1)
27.	A full binary tree with N leaf nodes has					
	a. N + 1 nodes	b. 2N + 1 nodes	c. 2N-1 nodes	d. N(N-1)/2 nodes		(1)

28.	A B-Tree of order 5 has a height of 2. What is the maximum number of nodes present in it?				
	a. 26	b. 124	c. 126	d. 24	(1)
29.	A binary tree T has 'n' leaf nodes. The number of nodes of degree 2 in T is _____				
	a. 2^n	b. n	c. $\log_2 n$	d. n-1	(1)
30.	The following numbers are inserted into an empty binary search tree in the given order: 10, 1, 3, 5, 15, 12, and 16. What is the height of the binary search tree?				
	a. 2	b. 3	c. 4	d. 5	(1)
31.	The inorder and preorder traversal of a binary tree are d b e a f c g and a b d e c f g respectively. The postorder traversal of the binary tree is _____.				
	a. e d b f g c a	b. d e f g b c a	c. e d b g f c a	d. d e b f g c a	(1)
32.	The degree of any vertex of graph is _____?				
	a. Path of the graph	b. Number of edges in a graph	c. Number of vertex in a graph	d. The number of edges incident with vertex	(1)
33.	Maximum number of edges in a n-node undirected graph without self loop is _____				
	a. $n(n-1)/2$	b. $(n+1)n/2$	c. n-1	d. n^2	(1)
34.	The depth first traversal of a graph G with n vertices, k edges are marked as tree edges. The number of connected components in G is _____				
	a. n-k-1	b. n-k	c. k+1	d. k	(1)
35.	In a _____ search, we begin at our search at the starting node A, and when we come across a dead end we back track.				
	a. breadth first	b. connected	c. bubble	d. depth first	(1)
36.	A _____ tree of a graph is just a subgraph that contains all the vertices and is a tree.				
	a. complete	b. balanced	c. binary	d. spanning	(1)
37.	If a graph with n vertices has less than n-1 vertices, then the graph is				
	a. disconnected	b. directed	c. complete	d. bi-connected	(1)
38.	The graph G is said to be _____ if each edge in the graph is assigned a non negative numerical value called the weight or length of the edge.				
	a. Complete	b. balanced	c. weighted	d. tree	(1)
39.	A graph G is _____ if every node u in G is adjacent to every node v in G				
	a. balanced	b. binary	c. complete	d. spanning	(1)
40.	If an edge has identical end points, it is called a _____				
	a. Loop	b. Degree	c. Path	d. Vertex	(1)

PART B(8 X 5 = 40 MARKS) (ANSWER ANY EIGHT)

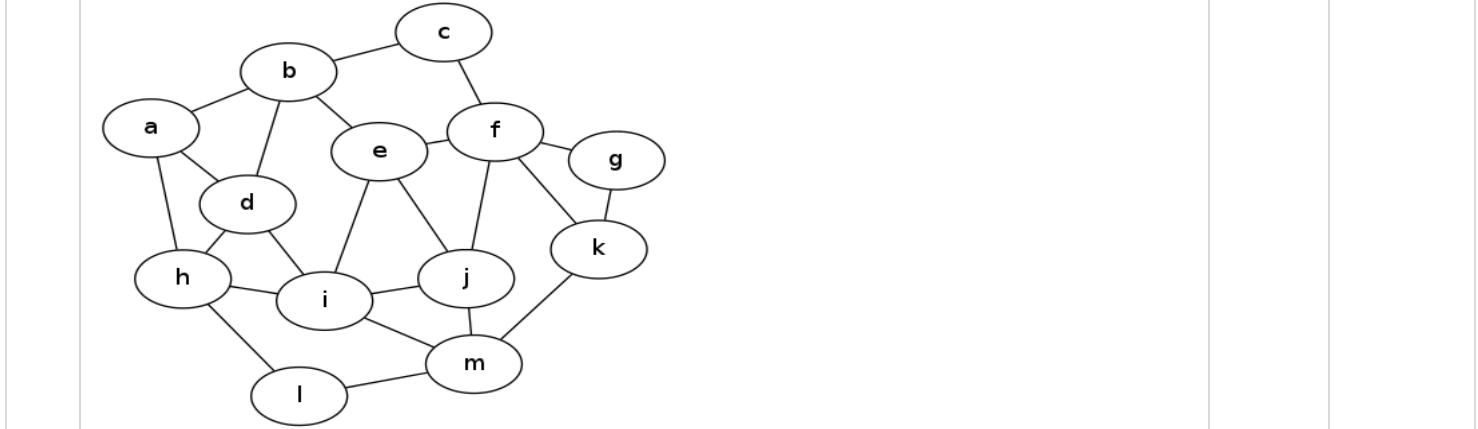
41.	Explain asymptotic (Big-Oh, Big-Omega, Big-Theta) notations.	(5)
42.	Evaluate the following postfix expression using stack. $AB * C - D / E +$ where A=3, B=4, C=2, D=5 and E=10.	(5)
43.	Describe the implementation of circular queue with a neat sketch and required algorithm/C++ code.	(5)
44.	Explain the algorithm/C++ code for deletion in a doubly linked list with an example.	(5)
45.	Demonstrate binary search with example	(5)
46.	Write the inorder, preorder and postorder tree traversal for the following tree	(5)



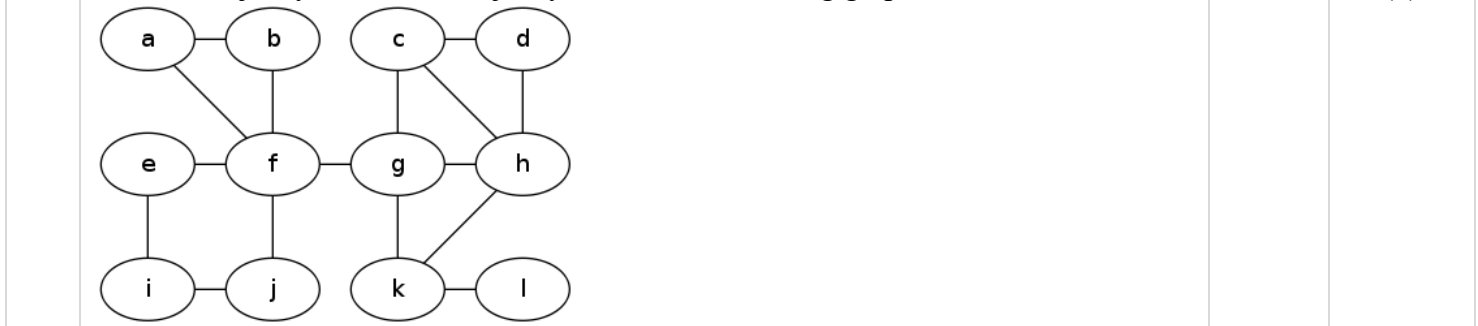
47. Demonstrate merge sort technique to sort the numbers 54 26 13 33 52 97 43 29 88 66 in asending order. (5)

48. Explain separate chaining technique for collision resolution in hashing. (5)

49. Describe DFS traversal technique and apply it on the following graph. (5)



50. Give the adjacency matrix and adjacency list for the following graph (5)

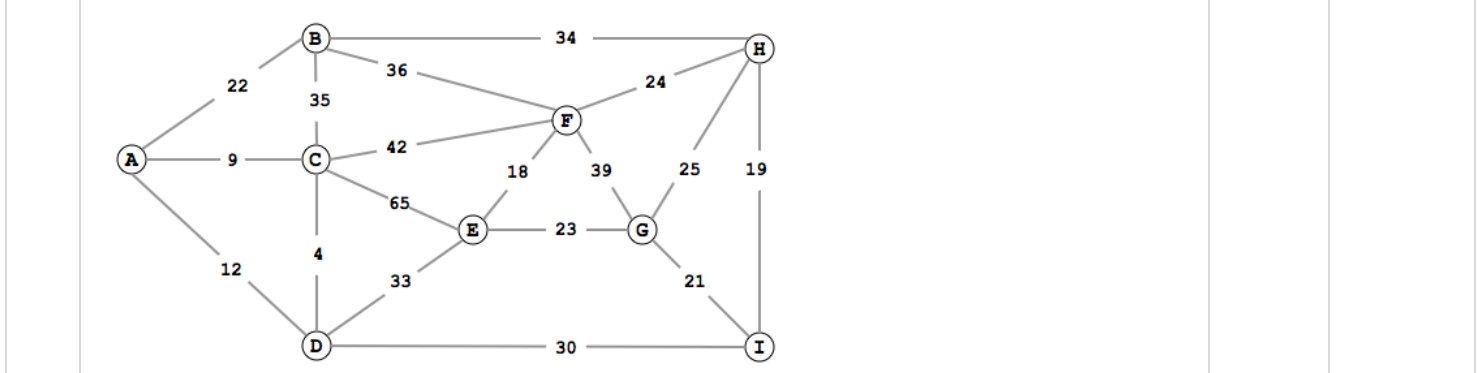


PART C (2 X 10 = 20 MARKS) (ANSWER ANY TWO)

51. Discuss the implementation of Queue data Structure using array with necessary pseudocodes/C++ code? (10)

52. Construct B-tree of order 3 with the following values by inserting them one by one in the order given: 9, 7, 5, 40, 1, 19, 34, 43, 17, 20, 18, 22, 42, 11, 2, 4 (10)

53. Explain Prim's algorithm in detail and apply it on the weighted graph given below. (10)



ALL THE BEST

*-unnecessary/extra rows can be deleted

*-course outcome (CO1,CO2...)should be included

Kindly remove the yellow shaded lines before publishing