Hall Ticket Number:

Code No. : 13615

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (IT.: CBCS) III-Semester Main Examinations, December-2018
Advanced Data Structures

Time: **3 hours**
Max. Marks: **60**

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Q. No	Stem of the Question	M	L	CO	PO
	Part-A (10 × 2 = 20 Marks)				
1.	Does friend function violate encapsulation? Justify.	2	4	1	1
2.	Consider the following code segment:	2	3	1	2
	``` void test(); void test(int=10); void test(int, int); int main() { int x=20, y=30; test(x); //call-1 test(); //call-2 test(x,y); //call-3 return 0; } ```				
	Identify the function call for which function overloading cannot be resolved, and why?				
3.	What is the ambiguity that might arise in multiple inheritance? How is it resolved?	2	2	2	1
4.	Represent the above expression $4x^3 + 3x^2 + x^1$ using Linked List.	2	2	2	1
5.	Differentiate full binary tree and complete binary tree.	2	2	3	1
6.	Write a recursive algorithm for Inorder traversal of a binary tree.	2	2	3	1
7.	State the significance of the red and black colors in Red Black tree.	2	2	4	1
8.	What is SPLAY tree? Where it is used in real world?	2	2	4	1
9.	Which data structures are used for BFS and DFS of a graph?	2	2	3	1
10.	What is a minimum spanning tree?	2	1	3	1
	Part-B (5 × 8 = 40 Marks)				
11. a)	List the properties of a static member variable and static member function in a C++ class.	4	1	1	1
b)	What is operator overloading? Write any 4 rules to overload an operator.	4	1	1	1
12. a)	What do you mean by runtime polymorphism? How virtual functions can be used to implement runtime polymorphism? Explain with the help of an example.	4	2	2	2
b)	Write a function *removeDuplicate()* to remove duplicate elements from a sorted circular linked list.	4	3	2	2

		M	L	CO	PO
13.	a) Show the steps involved in sorting the elements: **6 5 3 1 8 7** using Heap Sort, also write the algorithm for Heapify.	4	3	3	2
	b) Create a binary search tree with the help of the following traversals: Inorder:　A,B,C,D,E,F,G,P,Q,R Postorder: A,C,B,E,F,P,R,Q,G,D	4	3	4	2
14.	a) Define M-way search tree and write down its properties.	4	2	3	1
	b) Construct B-tree of order 5 (maximum 5 child nodes) using following sequence. 23, 11, 4, 89, 119, 52, 98, 349, 164, 450, 333, 15, 12, 17.	4	3	3	2
15.	a) Explain Hash tables and various types of hashing.	4	2	5	1
	b) Apply Prim's algorithm on following graph to find its minimum spanning tree.	4	3	3	2

		M	L	CO	PO
16.	a) What are constructors? Explain the different types of constructors with suitable example.	4	2	1	1
	b) What is exception handling? Write a program that illustrate exception handling with the help of keywords: try, throw and catch.	4	2	2	1
17.	Answer any *two* of the following:				
	a) Write an algorithm for non-recursive preorder traversal of binary tree.	4	2	3	1
	b) What is AVL tree? Explain all the rotations occurred during AVL Insertion.	4	2	4	1
	c) Consider inserting the keys **33, 44, 55, 46, 66, 77, 22** into a hash table of size m =11. Use the mid-square hash function to determine the home bucket for each of the keys. Use the chaining method for handling collisions.	4	3	5	2

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Program Outcome

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	57
2	Knowledge on application and analysis (Level-3 & 4)	43
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	-

&-&-&-&-&-&-&