Id	
Question	Folding is a method of generating
A	A hash function
B	Index function for a triangular matrix
C	Linear probing
D	Chaining.
Answer	A
Marks	1
Unit	3

Id	
Question	What is the hash key of 954 if hash function is x%3?
A	0
B	3
C	4
D	318
Answer	A
Marks	1
Unit	3

Id	
Question	What is the hash key of 7564 if hash function is x%5?
A	3
B	4
C	2
D	1
Answer	B
Marks	1
Unit	3

Id	
Question	What is the hash key of 7564 if hash function is x%10?
A	4
B	3
C	2
D	1
Answer	A
Marks	1
Unit	3

Id	
Question	In hash table, Overflow occurred when
A	Bucket is full
B	Keys are full
C	Only A
D	Both A and B
Answer	C
Marks	1
Unit	3

Id	
Question	The searching technique that takes O (1) time in average case to find a data is
A	Linear Search
B	Hashing
C	Binary Search
D	Tree Search
Answer	B
Marks	1
Unit	3

Id	
Question	An integer key x is divided by the table size m and the remainder is taken as the hash value. Which type of hash function is this?
A	Division method
B	Folding method
C	Mid square method
D	Digit analysis
Answer	A
Marks	1
Unit	3

Id	
Question	A key is multiplied by itself and the hash value is obtained by selecting an appropriate number of digits from the middle of the square. The same positions in the square must be used for all keys. Which hash function is this?
A	Division method
B	Folding method
C	Mid square method
D	Digit analysis
Answer	C
Marks	1
Unit	3

Id	
Question	A key is broken into several parts. Each part has the same length as that of the required address except the last part. The parts are added together, ignoring the last carry, we obtain the hash address for key K. Which hash function is this?
A	Division method
B	Folding method
C	Mid square method
D	Digit analysis
Answer	B
Marks	1
Unit	3

Id	
Question	A good hash function must have
A	Minimum collisions
B	Easy and quick to compute
C	Distribute the keys evenly over hash table
D	All of above
Answer	A
Marks	1
Unit	3

Id	
Question	A skip list is built in
A	0 layer
B	1 layer
C	Multiple layers
D	None
Answer	C
Marks	1
Unit	3

Id	
Question	The bottom layer in Skip List is an ordinary ordered ----
A	Array
B	Linked list
C	It depends
D	None
Answer	B
Marks	1
Unit	3

Id	
Question	A skiplist is capable of ------ insertion
A	O(log n)
B	O(n)
C	O(n*log n)
D	None
Answer	A
Marks	1
Unit	3

Id	
Question	A skiplist is capable of ------ removal of values from a sorted sequence
A	O(log n)
B	O(n)
C	O(n*log n)
D	None
Answer	A
Marks	1
Unit	3

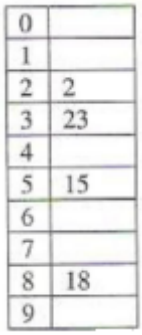
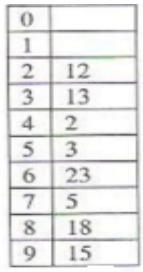
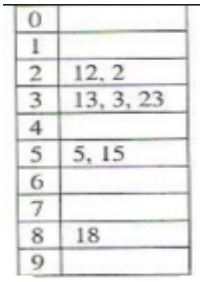
Id	
Question	A skiplist is capable of ------ lookups of values at a given position in the sequence (Worst case).
A	O(log n)
B	O(n)
C	O(n*log n)
D	None
Answer	B
Marks	1
Unit	4

Id	
Question	Which it true? i. Skip list algorithms have the same asymptotic expected time bounds as balanced trees. ii. They are simpler, faster and use less space.
A	i only
B	ii only
C	Both
D	None
Answer	C
Marks	1
Unit	3

Id	
Question	Dictionary can be implemented using
A	Hashtable
B	Singly Linked List
C	Binary Search Tree
D	All of the above
Answer	D
Marks	1
Unit	3

Id	
Question	The expected running time of all the dictionary ADT operations in a hash table is
A	O(1)
B	O(log n)
C	O(n)
D	None
Answer	A
Marks	1
Unit	3

Id	
Question	Consider a hash table of size seven, with starting index zero, and a hash function (3x + 4)mod7. Assuming the hash table is initially empty, which of the following is the contents of the table when the sequence 1, 3, 8, 10 is inserted into the table using closed hashing? Note that '_' denotes an empty location in the table.
A	8, _, _, _, _, _, 10
B	1, 8, 10, _, _, _, 3
C	1, _, _, _, _, _,3
D	1, 10, 8, _, _, _, 3
Answer	B
Marks	2
Unit	3

Id	
Question	The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function h(k) = k mod 10 and linear probing. What is the resultant hash table?
A	
B	
C	
D	
Answer	C
Marks	2

Unit	3

Id	
Question	A search for a target element in Skip List begins at the head element in the top list, and proceeds horizontally until the current element is ------ the target.
A	less than
B	less than or equal to
C	greater than
D	greater than or equal to
Answer	D
Marks	2
Unit	3

Id	
Question	Given a hash table T with 25 slots that stores 2000 elements, the load factor α for T is _____
A	80
B	0.0125
C	8000
D	1.25
Answer	A
Marks	2
Unit	3

Note: load factor = (no. of elements) / (no. of table slots) = 2000/25 = 80

Id	
Question	Which of the following statement(s) is TRUE? 1. A hash function takes a message of arbitrary length and generates a fixed length code. 2. A hash function takes a message of fixed length and generates a code of variable length. 3. A hash function may give the same hash value for distinct messages.
A	I only
B	II and III only
C	I and III only
D	II only
Answer	C
Marks	2
Unit	3

Id	
Question	Space complexity of skip list is -------
A	O(n log(n))
B	O(n)
C	O(log n)
D	O(1)
Answer	A
Marks	2
Unit	3

Id	
Question	A hash function f defined as f (key) = key mod 13, with linear probing is used to insert keys 55, 58, 68, 91, 27, 145. What will be the location of 79 ?
A	1
B	2
C	3
D	5
Answer	D
Marks	2
Unit	3

Id	
Question	Which of the following statement is true ?
A	Optimal binary search tree construction can be performed efficiently using dynamic programming.
B	Breath first search cannot be used to find converted components of a graph
C	Given the prefix and post fix walks over a binary tree.The binary tree cannot be uniquely constructe
D	Depth first search can be used to find connected components of a graph.
Answer	A
Marks	1
Unit	4

Id	
Question	A data structure is required for storing a set of integers such that each of the following operations can be done is (logn) time, where n is the number of elements in the set. 1. Delection of the smallest element. 2. Insertion of an element if it is not already present in the set. Which of the following data structures can be used for this purpose ?
A	A heap can be used but not a balanced binary search tree
B	A balanced binary search tree can be used but not a heap
C	Both balanced binary search tree and heap can be used
D	Neither balanced binary search tree nor heap can be used
Answer	B
Marks	2
Unit	4

Id	
Question	What is the maximum height of any AVL-tree with 7 nodes ? Assume that the height of a tree with a single node is 0.
A	2
B	3
C	4
D	5
Answer	B
Marks	2
Unit	4

Id	
Question	A hash function f defined as f(key)=key mod 7,with linear probling,insert the keys 37,38,72,48,98,11,56, into a table indexed from 11 will be stored in the location
A	3
B	4
C	5
D	6
Answer	C
Marks	2
Unit	4

Id	
Question	Which of the following statements is true? I. As the number of entries inthe hash table incrases, the number of collisions increases. II. Recursive programs are efficient. III. The worst time complexity of quick sort is O (n2). IV. Binary search implemented using a linked list is efficient.
A	I and II
B	II and III
C	I and IV
D	I and III
Answer	D
Marks	2
Unit	4

Id	
Question	If h is any hashing function and is used to hash n keys in to a table of size m, where n<=m, the expected number of collisions involving a particular key x is :
A	Less than 1
B	Less than n
C	Less than m
D	Less than n/2
Answer	A
Marks	2
Unit	4

Id	
Question	An AVL Tree is constructed by inserting the elements in the following order 5,4,2,3,7,6 the elements which are in the leaf node are
A	2,7,6
B	5,7
C	5,3,7
D	3,6
Answer	C
Marks	2
Unit	4

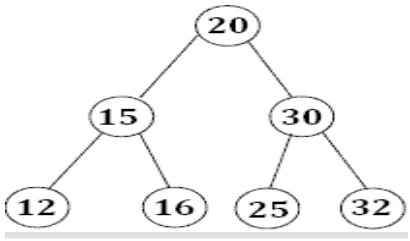
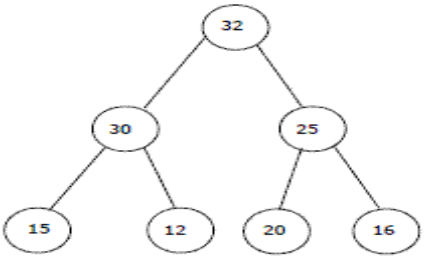
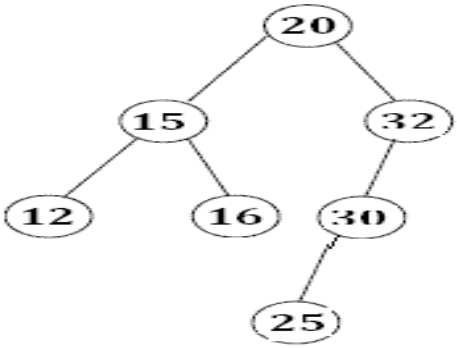
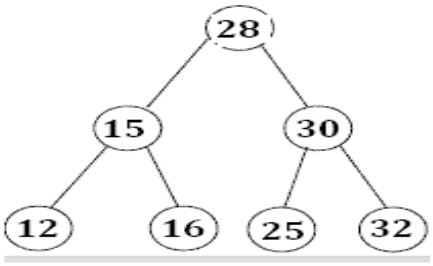
Id	
Question	The following insertions are made to an initially empty AVL Tree : 3,2,1,4,7,5,6 then the root of the right subtree of the AVL Tree is
A	7
B	6
C	4
D	2
Answer	A
Marks	2
Unit	4

Id	
Question	An AVL Tree is constructed by insertion of the following elements in the given order 10,7,8,5,3,4 then how many double rotations and single rotations were involved in the creation of this tree
A	1,1
B	2,1
C	1,2
D	2,2
Answer	B
Marks	
Unit	

Id	
Question	Consider a hash table of size seven, with starting index zero, and a hash function (3x + 4)mod7. Assuming the hash table is initially empty, which of the following is the contents of the table when the sequence 1, 3, 8, 10 is inserted into the table using closed hashing? Note that '_' denotes an empty location in the table.
A	8, _ _ _ _ _ _ 10
B	1, 8, 10, _ _ _ _ 3
C	1, _ _ _ _ _ _3
D	1, 10, 8, _ _ _ _ 3
Answer	B
Marks	2
Unit	4

Id	
Question	Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty AVL. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree?
A	7 5 1 0 3 2 4 6 8 9
B	0 2 4 3 1 6 5 9 8 7
C	0 1 2 3 4 5 6 7 8 9
D	9 8 6 4 2 3 0 1 5 7
Answer	C
Marks	2
Unit	4

Id	
Question	Which rotation is required to make right sub tree balance after insertion of node 7 in following tree?
A	RR
B	LL
C	RL
D	LR
Answer	B
Marks	2
Unit	4

Id	
Question	**The elements 32, 15, 20, 30, 12, 25, 16 are inserted one by one in the given order into a AVL TREE the resulting tree is**
A	
B	
C	
D	
Answer	A
Marks	2
Unit	4

<table>
<tr><td>Id</td><td></td></tr>
<tr><td>Question</td><td>A hash table of length 10 uses open addressing with hash function h(k)=k mod 10, and linear probing. After inserting 6 values into an empty hash table, the table is as shown below.
<table>
<tr><td>0</td><td></td></tr>
<tr><td>1</td><td></td></tr>
<tr><td>2</td><td>42</td></tr>
<tr><td>3</td><td>23</td></tr>
<tr><td>4</td><td>34</td></tr>
<tr><td>5</td><td>52</td></tr>
<tr><td>6</td><td>46</td></tr>
<tr><td>7</td><td>33</td></tr>
<tr><td>8</td><td></td></tr>
<tr><td>9</td><td></td></tr>
</table>
Which one of the following choices gives a possible order in which the key values could have been inserted in the table?</td></tr>
<tr><td>A</td><td>42, 34, 52, 23, 33</td></tr>
<tr><td>B</td><td>42, 23, 52, 33, 46</td></tr>
<tr><td>C</td><td>34, 42, 23, 52, 33</td></tr>
<tr><td>D</td><td>46, 33, 23, 34, 52</td></tr>
<tr><td>Answer</td><td>C</td></tr>
<tr><td>Marks</td><td>2</td></tr>
<tr><td>Unit</td><td>4</td></tr>
</table>

Id	
Question	A hash function f defined as **f(key)=key mod 7**,with linear probing, insert the keys 37,38,72,48,98,11,56, into a table indexed from 11 will be stored in the location
A	3
B	4
C	5
D	6
Answer	C
Marks	2
Unit	4

Id	
Question	What is the approximate height of an AVL tree having 30 nodes?
A	8
B	10
C	7
D	5
Answer	D
Marks	2
Unit	4

Id	
Question	Insert the following numbers in an empty AVL tree in the sequence 1, 2, 3, 4, 8, 7, 6. Find the root node
A	4
B	3
C	6
D	7
Answer	A
Marks	2
Unit	4

Id	
Question	Insert the following numbers in an empty AVL tree in the sequence 1, 2, 3, 4, 8, 7, 6. Give the left child and right child respectively of the root node.
A	3,6
B	2,7
C	2,8
D	3,8
Answer	B
Marks	2
Unit	4

Id	
Question	Consider a hashing function that resolves collision by quadratic probing. Assume the address space is indexed from 1 to 8. If a collision occurs at position 4, then the location which will never be probed is
A	4
B	5
C	8
D	2
Answer	D
Marks	2
Unit	4

Id	
Question	Suppose there is a AVL tree with n nodes in which k insertions are carried out. Then what is the running time purely for balancing the tree in worst case
A	Requires k rotations
B	Requires 2k rotations
C	Requires 3k rotations
D	Requires n+k rotations
Answer	B
Marks	2
Unit	4

Id	
Question	There is a AVL Tree whose preorder traversal is 70, 60, 50, 45, 65, 80, 75 if node with a key 70 is deleted then identify at which node key the balance is required in a AVL Tree
A	at 60 it is required
B	at 50 it is required
C	at 65 it is required
D	at 80 it is required
Answer	A
Marks	2
Unit	4

Id	
Question	If we create a AVL tree with the sequence 7, 10, 14, 23, 33, 56, 66, 70, 80 how many left rotations are required?
A	4
B	5
C	6
D	8
Answer	C
Marks	2
Unit	4

Id	
Question	If we create a AVL tree with the sequence 80, 70, 66, 56, 33, 23, 14, 10, 7 how many right rotations are required and at which addition of element in AVL tree that happens
A	4
B	5
C	6
D	8
Answer	B
Marks	2
Unit	4

Id	
Question	Consider a hash table of size 7, with starting index zero and H(K) as (3x+4) mod 7. Assuming the hash table is initially empty, which of the following is the content of the table when the sequence 1,3,8,10 is inserted into the table using closed hashing ?
A	8,-,-,-,-,-,10
B	1,8,10,-,-,-,3
C	1,-,-,-,-,-,3
D	1,10,8,-,-,-,3
Answer	D
Marks	2
Unit	4

Id	
Question	Consider a hash table of size 10, with starting index zero and H(K) =k mod 10. Assuming the hash table is initially empty, which of the following is the content of the table when the sequence 12,18,13,2,3,23,5 are inserted into the table using closed hashing ?
A	-,-,2,23,-,15,-,-,18,-
B	-,-,12,13,-,5,-,-,18,-
C	-,-,12,13,2,3,23,5,18,15
D	-,-,12,2,13,3,23,5,15,-,18
Answer	C
Marks	2
Unit	4

Id	
Question	Consider a hash table of size 10, with starting index zero and H(K) =k mod 10. Assuming the hash table is initially empty, how many collisions occures when the sequence 12,18,13,2,3,23,5 is inserted into the table using closed hashing?
A	3
B	5
C	7
D	4
Answer	B
Marks	2
Unit	4

Id	
Question	Hash table has a space for 100 records. What is probability of collision before the table is 10% full?
A	0.5
B	0.45
C	.9
D	.3
Answer	B
Marks	2
Unit	4

Id	
Question	Consider hash table of size is 10 and bucket size is 2. Consider a hash table of size 10, with starting index zero and H(K) =k mod 10. Assuming the hash table is initially empty, how many collisions and overflows occurs when the sequence 12,18,13,2,3,23,5 is inserted into the table using closed hashing?
A	Collision 3, Overflow 1
B	Collision 4, Overflow 0
C	Collision 1, Overflow 3
D	Collision 1, Overflow 1
Answer	A
Marks	2
Unit	4

Id	
Question	Consider employee numbers which starts with letter used for hash function. What should be maximum size of hash table ideally?
A	26
B	29
C	13
D	Unpredictable
Answer	B
Marks	2
Unit	4

Id	
Question	In OBST, the number of comparisons are required to search an element at depth d, with success are:
A	d
B	d+1
C	d-1
D	d*d
Answer	A
Marks	2
Unit	4

Id	
Question	Insert 30,31,32,23,22,28,24,29,26,27,34,36 in the AVL tree. How many total rotations required?
A	7
B	6
C	5
D	9
Answer	A
Marks	2
Unit	4

Id	
Question	Insert following keywords in the empty AVL tree. cout, cin, break, std, main Which rotations are required?
A	First LL and then RR
B	First RL and then RR
C	RL
D	LL
Answer	Correct option: A.
Marks	2
Unit	4

Id	
Question	Insert following in the empty AVL tree. DEC,JAN,APR,MAR,JUL Which symbol will rotate first?
A	DEC
B	JAN
C	MAR
D	JUL
Answer	C
Marks	2
Unit	4

Id	
Question	Construct AVL tree for following: 78,21,11,97. If 85 is inserted, which node is unbalance?
A	97
B	21
C	85
D	78
Answer	D
Marks	2
Unit	4

Id	

Question	Following code is for which rotation
	node * avl::Rotation(node* root)
	{
	node *temp;
	temp=root->right;
	root->right=temp->left;
	temp->left=root;
	temp->h=height(temp);
	root->h=height(root);
	return temp;
	}

A	LL
B	RR
C	RL
D	LR
Answer	B
Marks	2
Unit	4

Id	

Question	Following code is for which rotation
	`node * avl::Rotation(node* root)`
	`{`
	`node *temp;`
	`temp=root->left;`
	`root->left=temp->right;`
	`temp->right=root;`
	`temp->h=height(temp);`
	`root->h=height(root);`
	`return temp;`
	`}`

A	LL
B	RR
C	RL
D	LR
Answer	A
Marks	2
Unit	4

Id	

Question	Following code is for which rotation
	node * avl::rotation(node* root)
	{
	node *temp;
	root->left=RR(root->left);
	
	root=LL(root);
	return root;
	}

A	LL
B	RR
C	RL
D	LR
Answer	D
Marks	2
Unit	4

Id	
Question	A hash function f defined as f(key)=key mod 7 with linear probing is used to insert the keys 37,38,72,48,98,11,56,into a table indexed from 0 to 6. 11 will be stored in the location
A	3
B	4
C	5
D	6
Answer	C
Marks	2
Unit	4

Id	
Question	If h is any hashing function and is used to hash n keys in to a table of size m, where n<=m, the expected number of collisions involving a particular key x is :
A	less than 1.
B	less than n
C	less than m
D	less than n/2.
Answer	A
Marks	2
Unit	4

Id	
Question	Given the following input (4322, 1334, 1471, 9679, 1989, 6171, 6173, 4199) and the hash function x mod 10, which of the following statements are true? i. 9679, 1989, 4199 hash to the same value ii. 1471, 6171 has to the same value iii. All elements hash to the same value iv. Each element hashes to a different value
A	i only
B	ii only
C	i and ii only
D	iii or iv
Answer	C
Marks	2
Unit	4

Id	
Question	What is the best definition of a collision in a hash table?
A	Two entries are identical except for their keys.
B	Two entries with different data have the exact same key.
C	Two entries with different keys have the same exact hash value.
D	Two entries with the exact same key have different hash values.
Answer	B
Marks	2
Unit	4

Id	
Question	The worst case time complexity of AVL tree for Insert Operations is
A	O(log n)
B	O(n log n)
C	O(n)
D	None of these
Answer	A
Marks	2
Unit	4

Id	
Question	Number of comparisons required to search a balanced binary search tree of N nodes is
A	O(N)
B	O(N log N)
C	O(log2 N)
D	None of these
Answer	C
Marks	2
Unit	4

Id	
Question	What kind of initialization needs to be done for an chained hash table?
A	None
B	The key at each array location must be initialized
C	The head pointer of each chain must be set to NULL
D	Both B and C must be carried out
Answer	D
Marks	2
Unit	4

Id	
Question	Representation of data structure in memory is known as:
A	Recursive
B	Abstract data type
C	Storage structure
D	File structure
Answer	B
Marks	2
Unit	4

Id	
Question	The order of magnitude of the worst case performance of a hash coded search(over N elements)is
A	N
B	N $\log_2$ N
C	Log_2 N
D	Not dependent upon N
Answer	D
Marks	2
Unit	4

Id	
Question	Construct AVL tree for 25,38,15,22,10,24. When do you require LR rotation?
A	After insertion of 22
B	After insertion of 24
C	After insertion of 38
D	After insertion of 10
Answer	B
Marks	2
Unit	4

Id	
Question	Given the input 4371, 1323, 6173, 4199, 4344, 9679, 1989 and hash function h(X)=X mod 10. The number 1989 will be placed at index using quadratic probing _____?
A	8
B	9
C	0
D	1
Answer	A
Marks	2
Unit	4

Id	
Question	Given the input 4371, 1323, 6173, 4199, 4344, 9679, 1989 and hash function h(X)=X mod 10. The number 9679 will be placed at index using quadratic probing _____?
A	8
B	9
C	0
D	1
Answer	C
Marks	2
Unit	4

Id	
Question	Given the input 4371, 1323, 6173, 4199, 4344, 9679, 1989 and hash function h(X)=X mod 10. The number 4344 will be placed at index using quadratic probing _____?
A	3
B	4
C	5
D	6
Answer	C
Marks	2
Unit	4

Id	
Question	Which one is the negative side effect of linear probing?
A	Too many values hash to the same key and hence create long chain
B	Too many linked lists in the table which increases the time complexity
C	Too many values, all hash to the same area of the hash table and cause clustering
D	None of these
Answer	C
Marks	2
Unit	4

Id	
Question	If a hash table has n cells and there are n*10 objects. Use of linear probing _____?
A	Efficient
B	Inefficient
C	Depends on the keys
D	Depends on the hash function being used
Answer	B
Marks	2
Unit	4