Id	**1**
Question	Complexity for following line of code is “for (i = 0 ;i<=9; i++) “
A	O(9)
B	O(10)
C	O(11)
D	O(12)
Answer	
Marks	1.5
Unit	1

Id	**2**
Question	Is the sequence < 16,15,19,14,9,16,11, 12,10,9,8,7,4,1> Max Heap ?
A	Yes
B	No
C	
D	
Answer	
Marks	1.5
Unit	1

Id	**3**
Question	A recurrence is an equation that describes function in terms of its value on_____ inputs
A	Smaller
B	Larger
C	Equal to
D	User
Answer	
Marks	1.5
Unit	1

Id	**4**
Question	The data structure used in heapsort algorithm is
A	Min Heap and Array
B	Max Heap and Array
C	Tree and Array
D	Binary Tree
Answer	
Marks	1.5
Unit	1

Id	**5**
Question	When value of f(n) lies at or above c1g(n) and at or below c2g(n) then g(n) is _____ for f(n).
A	Asymtotically tight
B	Asymtotically loose
C	Asymtotically positive
D	Asymtotically non negative
Answer	
Marks	1.5
Unit	1

Id	**6**
Question	T(n) = 3T(n/2+ 47) + 2n^2 + 10*n – 1/2. T(n) will be
A	O(n^2)
B	O(n^(3/2))
C	O(n log n)
D	None of these
Answer	
Marks	1.5
Unit	1

Id	**7**
Question	Which of the following case does not exist in complexity theory?
A	Best case
B	Worst case
C	Average case
D	Null case
Answer	
Marks	1.5
Unit	1

Id	8

Question	What is the time, space complexity of following code:
	int a = 0, b = 0;
	for (i = 0; i < N; i++) {
	a = a + rand();
	}
	for (j = 0; j < M; j++) {
	b = b + rand();
	}

A	O(N * M) time, O(1) space
B	O(N + M) time, O(N + M) space
C	O(N + M) time, O(1) space
D	O(N * M) time, O(N + M) space
Answer	
Marks	1.5
Unit	1

Id	9

Question	What is the time complexity of following code:
	int a = 0;
	for (i = 0; i < N; i++) {
	for (j = N; j > i; j--) {
	a = a + i + j;
	}
	}

A	O(N)
B	O(N*log(N))
C	O(N * Sqrt(N))
D	O(N*N)
Answer	
Marks	1.5
Unit	1

Id	**10**
Question	What does it mean when we say that an algorithm X is asymptotically more efficient than Y?
A	X will always be a better choice for small inputs
B	X will always be a better choice for large inputs
C	Y will always be a better choice for small inputs
D	X will always be a better choice for all inputs
Answer	
Marks	1.5
Unit	1

Id	**11**
Question	The complexity of Fibonacci series is
A	O(2n)
B	O(log n)
C	$O(n^2)$
D	O(n log n)
Answer	
Marks	1.5
Unit	1

Id	**12**

Question	What is the time complexity of following code:
	int a = 0, i = N;
	while (i > 0) {
	a += i;
	i /= 2;
	}

A	O(N)
B	O(Sqrt(N))
C	O(N / 2)
D	O(log N)
Answer	
Marks	1.5
Unit	1

Id	**13**
Question	Solution to recurrence relation using Master Theorem ,T (n) = 4T (n/2) + n/ log n is
A	$\Theta(n^2)$
B	$\Theta(n)$
C	$\Theta(1)$
D	$\Theta(nlogn)$
Answer	
Marks	1.5
Unit	1

Id	**14**
Question	T (n) = 3T (n/4) + n log n
A	$\Theta(n^2)$
B	Θ(n log n)
C	Θ(n)
D	Θ(1)
Answer	
Marks	1.5
Unit	1

Id	**15**
Question	Solution to recurrence relation using Master Theorem is $T(n) = 4T(n/2) + cn$
A	$\Theta(n^2)$
B	$\Theta(n \log n)$
C	$\Theta(n)$
D	$\Theta(1)$
Answer	
Marks	1.5
Unit	1

Id	**16**
Question	Solution to recurrence relation using Master Theorem $T(n) = 16T(n/4) + n$ is
A	$\Theta(n^2)$
B	$\Theta(n \log n)$
C	$\Theta(n)$
D	$\Theta(1)$
Answer	
Marks	1.5
Unit	1

Id	17
Question	Solution to recurrence relation using Master Theorem $T(n) = 4T(n/2) + n^2$
A	$\Theta(n^2 \log n)$
B	$\Theta(n \log n)$
C	$\Theta(n)$
D	$\Theta(1)$
Answer	
Marks	1.5
Unit	1

Id	**18**
Question	Suppose T(n) = 2T(n/2) + n, T(0) = T(1) = 1 Which one of the following is false. a) T(n) = O(n^2) b) T(n) = Θ (nLogn) c) T(n) = Ω(n^2) d) T(n) = O(nLogn
A	A
B	B
C	C
D	D
Answer	
Marks	1.5
Unit	1

Id	**19**
Question	Master’s theorem can be applied on which of the following recurrence relation?
A	T (n) = 2T (n/2) + 2^n
B	T (n) = 2T (n/3) + sin(n)
C	T (n) = T (n-2) + 2n^2 + 1
D	None of these
Answer	
Marks	1.5
Unit	1

Id	**20**
Question	T(n) = 3T(n/2+ 47) + 2n^2 + 10*n – 1/2. T(n) will be
A	O(n^2)
B	O(n^(3/2))
C	O(n log n)
D	None of these
Answer	
Marks	1.5
Unit	1

Id	**21**
Question	Solution to recurrence $T(n) = 2T(n/4) + n^{0.51}$ using Master method is
A	$\Theta(n^{0.51})$
B	$\Theta(n^2)$
C	$\Theta(n)$
D	$\Theta(n^3)$
Answer	
Marks	1.5
Unit	1

Id	**22**
Question	Let w(n) and A(n) denote respectively, the worst case and average case running time of an algorithm executed on an input of size n. which of the following is ALWAYS TRUE? A.A(n) = Ω W(n) B.A(n) = Θ W(n) C. A(n) = O W(n) D. A(n) = o W(n)
A	A
B	B
C	C
D	D
Answer	
Marks	1.5
Unit	1

Id	23
Question	In a competition, four different functions are observed. All the functions use a single for loop and within the for loop, same set of statements are executed. Consider the following for loops: A) for(i = 0; i < n; i++) B) for(i = 0; i < n; i += 2) C) for(i = 1; i < n; i *= 2) D) for(i = n; i > -1; i /= 2) If **n** is the size of input(positive), which function is most efficient (if the task to be performed is not an issue)?
A	A
B	B
C	C
D	D
Answer	
Marks	1.5
Unit	1

Id	**24**

Question	The time complexity of the following C function is (assume n > 0)
	int recursive (mt n)
	{
	if (n == 1)
	return (1);
	else
	return (recursive (n-1) + recursive (n-1));
	}

A	O(n)
B	O(nlogn)
C	O(n^2)
D	O(n^2)
Answer	
Marks	1.5
Unit	1

Id	**25**
Question	Consider the following recurrence: $T(n) = 2T(n^{1/2}) + 1$ $T(1) = 1$ Which of the following is true?
A	$T(n)= O(\log \log n)$
B	$T(n) = O(\log n)$
C	$T(n) = O(n^{1/2})$
D	$T(n)= O(n)$
Answer	
Marks	1.5
Unit	1

Id	**26**
Question	A algorithm having $O(n^3)$ time is faster than algorithm having O(logn) time.
A	True
B	False
C	
D	
Answer	
Marks	1.5
Unit	1

Id	**27**
Question	When running time is constant it is not affected by input size.
A	True
B	False
C	
D	
Answer	
Marks	1.5
Unit	1

Id	**28**
Question 45	If f(n) = 2n and g(n) = n then which of the following statements is true ?
A	f(n) is Og(n) and g(n) is Of(n)
B	Only f (n) is Og(n)
C	Only g(n) is Of(n)
D	None of the above
Answer	
Marks	1.5
Unit	1

Id	**29**
Question	Recurrence can be solved by
A	Master Theorem
B	Substitution
C	Recursion Tree
D	All of the above
Answer	
Marks	1.5
Unit	1

Id	**30**
Question	$T(n) = 2^n T(n/2) + n^n$ then solution by master theorem is
A	$O(n^2)$
B	O(n log n log n)
C	O(n)
D	Master theorem does not apply
Answer	
Marks	1.5
Unit	1

Id	**31**
Question	$T(n) = 0.5T(n/2) + 1/n$ then solution by master theorem is
A	$O(n^2)$
B	O(n log n log n)
C	O(n)
D	Master theorem does not apply
Answer	
Marks	1.5
Unit	1

Id	**32**
Question	Consider the problem of computing min-max in an unsorted array where min and max are minimum and maximum elements of array. Algorithm A1 can compute min-max in a1 comparisons without divide and conquer. Algorithm A2 can compute min-max in a2 comparisons by scanning the array linearly. What could be the relation between a1 and a2 considering the worst case scenarios?
A	a1 < a2
B	a1 > a2
C	a1 = a2
D	Depends on the input
Answer	
Marks	1.5
Unit	2

Id	**33**
Question	Step(s) in Divide and conquer process that takes a recursive approach is said to be
A	Conquer/Solve
B	Merge/Combine
C	Divide/Break
D	Both B and C
Answer	
Marks	1.5
Unit	2

Id	**34**
Question	Strassen’s algorithm needs____ many multiplications to multiply two 2×2 matrices
A	8
B	9
C	7
D	3
Answer	
Marks	1.5
Unit	2

Id	**35**
Question	Recurrence relation for binary search
A	$T(n) = 2T(n/2) + \Theta(1)$
B	$T(n) = T(n/2) + \Theta(1)$
C	$T(n) = 2T(n/2) + \Theta(n)$
D	$T(n) = 2T(n/2) + \Theta(n^2)$
Answer	
Marks	1.5
Unit	2

Id	**36**
Question	Strassen’s method has running time (for multiplying two n×n matrices)
A	Θ(n)
B	Θ(n2)
C	Θ(n3)
D	None of the above
Answer	
Marks	1.5
Unit	2

Id	**37**
Question	The number of multiplication operations for multiplying two 4X4 matrices using Strassen's algorithm is _____
A	48
B	56
C	64
D	52
Answer	
Marks	1.5
Unit	2

Id	**38**
Question	Binary Search is an example of
A	Greedy Algorithm
B	Dynamic programming Algorithm
C	Divide and Conquer Algorithm
D	Backtracking Algorithm
Answer	
Marks	1.5
Unit	2

Id	**39**
Question	Strassen’s algorithm is a/an _____algorithm.
A	Non- recursive
B	Recursive
C	Approximation
D	Accurate
Answer	
Marks	1.5
Unit	2

Id	**40**
Question	Which of the following is correct recurrence for worst case of Binary Search?
A	$T(n) = 2T(n/2) + O(1)$ and $T(1) = T(0) = O(1)$
B	$T(n) = T(n-1) + O(1)$ and $T(1) = T(0) = O(1)$
C	$T(n) = T(n/2) + O(1)$ and $T(1) = T(0) = O(1)$
D	$T(n) = T(n-2) + O(1)$ and $T(1) = T(0) = O(1)$
Answer	
Marks	1.5
Unit	2

Id	**41**
Question	Given a sorted array of integers, what can be the minimum worst case time complexity to find ceiling of a number x in given array? Ceiling of an element x is the smallest element present in array which is greater than or equal to x. Ceiling is not present if x is greater than the maximum element present in array. For example, if the given array is {12, 67, 90, 100, 300, 399} and x = 95, then output should be 100
A	O(LogLogn)
B	O(n)
C	O(Logn)
D	O(Logn * Logn)
Answer	
Marks	1.5
Unit	2

Id	**42**
Question	Which of the following sorting algorithms is the fastest?
A	Merge sort
B	Quick sort
C	Insertion sort
D	Shell sort
Answer	
Marks	1.5
Unit	2

Id	**43**
Question	Quick sort follows Divide-and-Conquer strategy.
A	True
B	False
C	
D	
Answer	
Marks	1.5
Unit	2

Id	**44**
Question	What is the worst case time complexity of a quick sort algorithm?
A	O(N)
B	O(N log N)
C	O(N2)
D	O(log N)
Answer	
Marks	1.5
Unit	2

Id	**45**
Question	Which of the following methods is the most effective for picking the pivot element?
A	first element
B	last element
C	median-of-three partitioning
D	random element
Answer	
Marks	1.5
Unit	2

Id	**46**
Question	Find the pivot element from the given input using median-of-three partitioning method. 8, 1, 4, 9, 6, 3, 5, 2, 7, 0
A	8
B	7
C	9
D	6
Answer	
Marks	1.5
Unit	2

Id	**47**
Question	Which is the safest method to choose a pivot element?
A	choosing a random element as pivot
B	choosing the first element as pivot
C	choosing the last element as pivot
D	median-of-three partitioning method
Answer	
Marks	1.5
Unit	2

Id	**48**
Question	What is the average running time of a quick sort algorithm?
A	O(N2)
B	O(N)
C	O(N log N)
D	O(log N)
Answer	
Marks	1.5
Unit	2

Id	**49**
Question	How many sub arrays does the quick sort algorithm divide the entire array into?
A	One
B	Two
C	Three
D	Four
Answer	
Marks	1.5
Unit	2

Id	**50**
Question	Which among the following is the best cut-off range to perform insertion sort within a quick sort?
A	N=0-5
B	N=5-2
C	N=20-30
D	N>30
Answer	
Marks	1.5
Unit	2

Id	**51**
Question	Which is the worst method of choosing a pivot element?
A	first element as pivot
B	last element as pivot
C	median-of-three partitioning
D	random element as pivot
Answer	
Marks	1.5
Unit	2

Id	**52**
Question	Apply Quick sort on a given sequence 7 11 14 6 9 4 3 12. What is the sequence after first phase, pivot is first element?
A	6 4 3 7 11 9 14 12
B	6 3 4 7 9 14 11 12
C	7 6 14 11 9 4 3 12
D	7 6 4 3 9 14 11 12
Answer	
Marks	1.5
Unit	2

Id	**53**
Question	The best case behaviour occurs for quick sort is, if partition splits the array of size n into _____
A	n/2 : (n/2) – 1
B	n/2 : n/3
C	n/4 : 3n/2
D	n/4 : 3n/4
Answer	
Marks	1.5
Unit	2

Id	**54**
Question	Consider the Quick sort algorithm in which the partitioning procedure splits elements into two sub-arrays and each sub-array contains at least one-fourth of the elements. Let T(n) be the number of comparisons required to sort array of n elements. Then
A	T(n) <= 2 T(n/4) + cn
B	T(n) <= T(n/4) + T(3n/4) + cn
C	T(n) <= 2 T(3n/4) + cn
D	T(n) <= T(n/3) + T(3n/4) + cn
Answer	
Marks	1.5
Unit	2

Id	**55**
Question	Consider the Quick sort algorithm which sorts elements in ascending order using the first element as pivot. Then which of the following input sequence will require number of comparisons when this algorithm is applied on it?
A	22 25 56 67 89
B	52 25 76 67 89
C	22 25 76 67 50
D	52 25 89 67 76
Answer	
Marks	1.5
Unit	2

Id	**56**
Question	A machine needs a minimum of 200 sec to sort 1000 elements by Quick sort. The minimum time needed to sort 200 elements will be approximately.
A	60.2 sec
B	45.54 sec
C	31.11 sec
D	20 sec
Answer	
Marks	1.5
Unit	2

Id	**57**
Question	Merge sort uses which of the following algorithm to implement sorting?
A	backtracking
B	greedy algorithm
C	divide and conquer
D	dynamic programming
Answer	
Marks	1.5
Unit	2

Id	**58**
Question	What is the average case time complexity of standard merge sort?
A	O(n log n)
B	$O(n^2)$
C	$O(n^2 \log n)$
D	$O(n \log n^2)$
Answer	
Marks	1.5
Unit	2

Id	**59**
Question	You have to sort 1 GB of data with only 100 MB of available main memory. Which sorting technique will be most appropriate?
A	Heap sort
B	Merge sort
C	Quick sort
D	Insertion sort
Answer	
Marks	1.5
Unit	2

Id	**60**
Question	What is the worst case complexity of binary search using recursion?
A	O(nlogn)
B	O(logn)
C	O(n)
D	None of these
Answer	
Marks	1.5
Unit	2

Id	**61**
Question	Which of the following is not an application of binary search?
A	To find the lower/upper bound in an ordered sequence
B	Union of intervals
C	Debugging
D	To search in unordered list
Answer	
Marks	1.5
Unit	2

Id	**62**
Question	Which of the following standard algorithms is not a Greedy algorithm?
A	Dijkstra's shortest path algorithm
B	Prim's algorithm
C	Huffman Coding
D	Bellmen Ford Shortest path algorithm
Answer	
Marks	1.5
Unit	3

Id	**63**
Question	What is the time complexity of Huffman Coding?
A	O(N)
B	O(NlogN)
C	O(N(logN)^2)
D	O(N^2)
Answer	
Marks	1.5
Unit	3

Id	**64**
Question	Which of the following is true about Kruskal and Prim MST algorithms? Assume that Prim is implemented for adjacency list representation using Binary Heap and Kruskal is implemented using union by rank.
A	Worst case time complexity of both algorithms is same
B	Worst case time complexity of Kruskal is better than Prim
C	Worst case time complexity of Prim is better than Kruskal
D	None of the above
Answer	
Marks	1.5
Unit	3

Id	**65**
Question	Which of the following is true about Huffman Coding?
A	Huffman coding may become lossy in some cases
B	Huffman Codes may not be optimal lossless codes in some cases
C	In Huffman coding, no code is prefix of any other code
D	All of the above
Answer	
Marks	1.5
Unit	3

Id	**66**
Question	Suppose the letters a, b, c, d, e, f have probabilities 1/2, 1/4, 1/8, 1/16, 1/32, 1/32 respectively. Which of the following is the Huffman code for the letter a, b, c, d, e, f?
A	0, 10, 110, 1110, 11110, 11111
B	11, 10, 011, 010, 001, 000
C	11, 10, 01, 001, 0001, 0000
D	110, 100, 010, 000, 001, 111
Answer	
Marks	1.5
Unit	3

Id	**67**
Question	Suppose the letters a, b, c, d, e, f have probabilities 1/2, 1/4, 1/8, 1/16, 1/32, 1/32 respectively. What is the average length of Huffman codes?
A	3
B	2.1875
C	2.25
D	1.9375
Answer	
Marks	1.5
Unit	3

Id	**68**
Question	A text is made up of the characters a, b, c, d, e each occurring with the probability 0.11, 0.40, 0.16, 0.09 and 0.24 respectively. The optimal Huffman coding technique will have the average length of:
A	2.40
B	2.16
C	2.26
D	2.15
Answer	
Marks	1.5
Unit	3

Id	**69**
Question	Six files F1, F2, F3, F4, F5 and F6 have 100, 200, 50, 80, 120, 150 records respectively. In what order should they be stored so as to optimize act. Assume each file is accessed with the same frequency
A	F3, F4, F1, F5, F6, F2
B	F2, F6, F5, F1, F4, F3
C	F1, F2, F3, F4, F5, F6
D	Ordering is immaterial as all files are accessed with the same frequency.
Answer	
Marks	1.5
Unit	3

Id	**70**
Question	Consider a job scheduling problem with 4 jobs J1, J2, J3, J4 and with corresponding deadlines: (d1, d2, d3, d4) = (4, 2, 4, 2). Which of the following is not a feasible schedule without violating any job schedule?
A	J2, J4, J1, J3
B	J4, J1, J2, J3
C	J4, J2, J1, J3
D	J4, J2, J3, J1
Answer	
Marks	1.5
Unit	3

Id	**71**
Question	Kruskal’s algorithm is used to _____
A	find minimum spanning tree
B	find single source shortest path
C	find all pair shortest path algorithm
D	traverse the graph
Answer	
Marks	1.5
Unit	3

Id	**72**
Question	Kruskal’s algorithm is a
A	divide and conquer algorithm
B	dynamic programming algorithm
C	greedy algorithm
D	approximation algorithm
Answer	
Marks	1.5
Unit	3

Id	**73**
Question	Which of the following is true?
A	Prim’s algorithm can also be used for disconnected graphs
B	Kruskal’s algorithm can also run on the disconnected graphs
C	Prim’s algorithm is simpler than Kruskal’s algorithm
D	In Kruskal’s sort edges are added to MST in decreasing order of their weights
Answer	
Marks	1.5
Unit	3

Id	**74**
Question	Consider the following statements. S1. Kruskal's algorithm might produce a non-minimal spanning tree. S2. Kruskal's algorithm can efficiently implemented using the disjoint-set data structure.
A	S1 is true but S2 is false
B	Both S1 and S2 are false
C	Both S1 and S2 are true
D	S2 is true but S1 is false
Answer	
Marks	1.5
Unit	3

Id	**75**
Question	Which of the following is true?
A	Prim’s algorithm initialises with a vertex
B	Prim’s algorithm initialises with a edge
C	Prim’s algorithm initialises with a vertex which has smallest edge
D	Prim’s algorithm initialises with a forest
Answer	
Marks	1.5
Unit	3

Id	**76**
Question	Worst case is the worst case time complexity of Prim's algorithm if adjacency matrix is used?
A	O(log V)
B	$O(V^2)$
C	$O(E^2)$
D	O(V log E)
Answer	
Marks	1.5
Unit	3

Id	**77**
Question	Prim’s algorithm is a
A	Divide and conquer algorithm
B	Greedy algorithm
C	Dynamic Programming
D	Approximation algorithm
Answer	
Marks	1.5
Unit	3

Id	**78**
Question	Prim’s algorithm resembles Dijkstra’s algorithm.
A	True
B	False
C	
D	
Answer	
Marks	1.5
Unit	3

Id	**79**
Question	Prim’s algorithm can be efficiently implemented using _____ for graphs with greater density.
A	d-ary heap
B	linear search
C	fibonacci heap
D	binary search
Answer	
Marks	1.5
Unit	3

Id	**80**
Question	Which of the following is false about Prim’s algorithm?
A	It is a greedy algorithm
B	It constructs MST by selecting edges in increasing order of their weights
C	It never accepts cycles in the MST
D	It can be implemented using the Fibonacci heap
Answer	
Marks	1.5
Unit	3

Id	**81**
Question	The type of encoding where no character code is the prefix of another character code is called?
A	optimal encoding
B	prefix encoding
C	frequency encoding
D	trie encoding
Answer	
Marks	1.5
Unit	3

Id	**82**
Question	What is the running time of the Huffman algorithm, if its implementation of the priority queue is done using linked lists?
A	O(C)
B	O(log C)
C	O(C log C)
D	$O(C^{2)}$
Answer	
Marks	1.5
Unit	3

Id	**83**
Question	To implement Dijkstra’s shortest path algorithm on unweighted graphs so that it runs in linear time, the data structure to be used is:
A	Queue
B	Stack
C	Heap
D	B-tree
Answer	
Marks	1.5
Unit	3

Id	**84**
Question	In an unweighted, undirected connected graph, the shortest path from a node S to every other node is computed most efficiently, in terms of time complexity by
A	Dijkstra’s algorithm starting from S
B	Warshall’s algorithm
C	Performing a DFS starting from S
D	Performing a BFS starting from S
Answer	
Marks	1.5
Unit	3

Id	**85**
Question	Which of the following is the most commonly used data structure for implementing Dijkstra’s Algorithm?
A	Max priority queue
B	Stack
C	Circular queue
D	Min priority queue
Answer	
Marks	1.5
Unit	3

Id	**86**
Question	What is the time complexity of Dijikstra's algorithm?
A	O(N)
B	$O(N^3)$
C	$O(N^2)$
D	O(logN)
Answer	
Marks	1.5
Unit	3

Id	**87**
Question	How many priority queue operations are involved in Dijkstra's Algorithm?
A	1
B	3
C	2
D	4
Answer	
Marks	1.5
Unit	3

Id	**88**
Question	The maximum number of times the decrease key operation performed in Dijkstra's algorithm will be equal to _____
A	Total number of vertices
B	Total number of edges
C	Number of vertices – 1
D	Number of edges – 1
Answer	
Marks	1.5
Unit	3

Id	**89**
Question	Dijkstra’s Algorithm cannot be applied on
A	Directed and weighted graphs
B	Graphs having negative weight function
C	Unweighted graphs
D	Undirected and unweighted graphs
Answer	
Marks	1.5
Unit	3

Id	**90**
Question	You are given a knapsack that can carry a maximum weight of 60. There are 4 items with weights {20, 30, 40, 70} and values {70, 80, 90, 200}. What is the maximum value of the items you can carry using the knapsack?
A	160
B	200
C	170
D	90
Answer	
Marks	1.5
Unit	3

Id	**91**
Question	Which of the following standard algorithms is not Dynamic Programming based.
A	Bellman–Ford Algorithm for single source shortest path
B	Floyd Warshall Algorithm for all pairs shortest paths
C	0-1 Knapsack problem
D	Prim's Minimum Spanning Tree
Answer	
Marks	1.5
Unit	4

Id	**92**
Question	We use dynamic programming approach when
A	We need an optimal solution
B	The solution has optimal substructure
C	The given problem can be reduced to the 3-SAT problem
D	It's faster than Greedy
Answer	
Marks	1.5
Unit	4

Id	**93**
Question	Which of the following statements is TRUE?
A	The algorithm uses dynamic programming paradigm
B	The algorithm has a linear complexity and uses branch and bound paradigm
C	The algorithm has a non-linear polynomial complexity and uses branch and bound paradigm
D	The algorithm uses divide and conquer paradigm.
Answer	
Marks	1.5
Unit	4

Id	**94**
Question	The following paradigm can be used to find the solution of the problem in minimum time: Given a set of non-negative integer, and a value K, determine if there is a subset of the given set with sum equal to K:
A	Divide and Conquer
B	Dynamic Programming
C	Greedy Algorithm
D	Branch and Bound
Answer	
Marks	1.5
Unit	4

Id	**95**
Question	In the above question, which entry of the array X, if TRUE, implies that there is a subset whose elements sum to W?
A	X[1, W]
B	X[n ,0]
C	X[n, W]
D	X[n -1, n]
Answer	
Marks	1.5
Unit	4

Id	**96**
Question	Let A1, A2, A3, and A4 be four matrices of dimensions 10 x 5, 5 x 20, 20 x 10, and 10 x 5, respectively. The minimum number of scalar multiplications required to find the product A1A2A3A4 using the basic matrix multiplication method is
A	1500
B	2000
C	500
D	100
Answer	
Marks	1.5
Unit	4

Id	**97**
Question	Which of the following methods can be used to solve the longest common subsequence problem?
A	Recursion
B	Dynamic programming
C	Both recursion and dynamic programming
D	Both recursion and dynamic programming
Answer	
Marks	1.5
Unit	4

Id	**98**
Question	Which of the following methods can be used to solve the longest common subsequence problem?
A	Recursion
B	Dynamic programming
C	Both recursion and dynamic programming
D	Both recursion and dynamic programming
Answer	
Marks	1.5
Unit	4

Id	**99**
Question	Consider the strings “PQRSTPQRS” and “PRATPBRQRPS”. What is the length of the longest common subsequence?
A	9
B	8
C	7
D	6
Answer	
Marks	1.5
Unit	4

Id	**100**
Question	Which of the following problems can be solved using the longest subsequence problem?
A	Longest increasing subsequence
B	Longest palindromic subsequence
C	Longest bitonic subsequence
D	None of the mentioned
Answer	
Marks	1.5
Unit	4

Id	**101**
Question	Longest common subsequence is an example of _____
A	Greedy algorithm
B	2D dynamic programming
C	1D dynamic programming
D	Divide and conquer
Answer	
Marks	1.5
Unit	4

Id	**102**
Question	What is the time complexity of the brute force algorithm used to find the longest common subsequence?
A	O(n)
B	O(n2)
C	O(n3)
D	O(2^n)
Answer	
Marks	1.5
Unit	4

Id	**103**
Question	What is the time complexity of the above dynamic programming implementation of the longest common subsequence problem where length of one string is “m” and the length of the other string is “n”?
A	O(n)
B	O(m)
C	O(m + n)
D	O(mn)
Answer	
Marks	1.5
Unit	4

Id	**104**
Question	Which of the following is the longest common subsequence between the strings “hbcfgmnapq” and “cbhgrsfnmq” ?
A	hgmq
B	cfnq
C	bfmq
D	all of the mentioned
Answer	
Marks	1.5
Unit	4

Id	**105**
Question	Which of the following methods can be used to solve the matrix chain multiplication problem?
A	Dynamic programming
B	Brute force
C	Recursion
D	All of the mentioned
Answer	
Marks	1.5
Unit	4

Id	**106**
Question	Consider the two matrices P and Q which are 10 x 20 and 20 x 30 matrices respectively. What is the number of multiplications required to multiply the two matrices?
A	10*20
B	20*30
C	10*30
D	10*20*30
Answer	
Marks	1.5
Unit	4

Id	**107**
Question	Consider the matrices P, Q and R which are 10 x 20, 20 x 30 and 30 x 40 matrices respectively. What is the minimum number of multiplications required to multiply the three matrices?
A	18000
B	12000
C	24000
D	32000
Answer	
Marks	1.5
Unit	4

Id	**108**
Question	Consider the matrices P, Q, R and S which are 20 x 15, 15 x 30, 30 x 5 and 5 x 40 matrices respectively. What is the minimum number of multiplications required to multiply the four matrices?
A	6050
B	7500
C	7750
D	12000
Answer	
Marks	1.5
Unit	4

Id	**109**
Question	What is the time complexity of the above dynamic programming implementation of the matrix chain problem?
A	O(1)
B	O(n)
C	$O(n^2)$
D	$O(n^3)$
Answer	
Marks	1.5
Unit	4

Id	**110**
Question	Which of the following is/are property/properties of a dynamic programming problem?
A	Optimal substructure
B	Overlapping subproblems
C	Greedy approach
D	Both optimal substructure and overlapping subproblems
Answer	
Marks	1.5
Unit	4

Id	**111**
Question	Which design strategy stops the execution when it find the solution otherwise startsthe problem from top
A	Back tracking
B	Branch and Bound
C	Divide and conquer
D	Dynamic programming
Answer	
Marks	1.5
Unit	5

Id	**112**
Question	Which of the problems cannot be solved by backtracking method?
A	n-queen problem
B	subset sum problem
C	hamiltonian circuit problem
D	travelling salesman problem
Answer	
Marks	1.5
Unit	5

Id	**113**
Question	Which of the problems cannot be solved by backtracking method?
A	n-queen problem
B	subset sum problem
C	hamiltonian circuit problem
D	travelling salesman problem
Answer	
Marks	1.5
Unit	5

Id	**114**
Question	Backtracking algorithm is implemented by constructing a tree of choices called as?
A	State-space tree
B	State-chart tree
C	Node tree
D	Backtracking tree
Answer	
Marks	1.5
Unit	5

Id	**115**
Question	What happens when the backtracking algorithm reaches a complete solution?
A	It backtracks to the root
B	It continues searching for other possible solutions
C	It traverses from a different route
D	Recursively traverses through the same route
Answer	
Marks	1.5
Unit	5

Id	**116**
Question	A node is said to be _____ if it has a possibility of reaching a complete solution
A	Non-promising
B	Promising
C	Succeeding
D	Preceding
Answer	
Marks	1.5
Unit	5

Id	**117**
Question	In what manner is a state-space tree for a backtracking algorithm constructed?
A	Depth-first search
B	Breadth-first search
C	Twice around the tree
D	Nearest neighbour first
Answer	
Marks	1.5
Unit	5

Id	**118**
Question	The leaves in a state-space tree represent only complete solutions.
A	True
B	False
C	
D	
Answer	
Marks	1.5
Unit	5

Id	**119**
Question	In general, backtracking can be used to solve?
A	Numerical problems
B	Exhaustive search
C	Combinatorial problems
D	Graph coloring problems
Answer	
Marks	1.5
Unit	5

Id	**120**
Question	Which one of the following is an application of the backtracking algorithm?
A	Finding the shortest path
B	Finding the efficient quantity to shop
C	Ludo
D	Crossword
Answer	
Marks	1.5
Unit	5

Id	**121**
Question	Backtracking algorithm is faster than the brute force technique
A	True
B	False
C	
D	
Answer	
Marks	1.5
Unit	5

Id	**122**
Question	Which of the following logical programming languages is not based on backtracking?
A	Icon
B	Prolog
C	Planner
D	Fortran
Answer	
Marks	1.5
Unit	5

Id	**123**
Question	The problem of finding a list of integers in a given specific range that meets certain conditions is called?
A	Subset sum problem
B	Constraint satisfaction problem
C	Hamiltonian circuit problem
D	Travelling salesman problem
Answer	
Marks	1.5
Unit	5

Id	**124**
Question	_____ enumerates a list of promising nodes that could be computed to give the possible solutions of a given problem.
A	Exhaustive search
B	Brute force
C	Backtracking
D	Divide and conquer
Answer	
Marks	1.5
Unit	5

Id	**125**
Question	The problem of finding a subset of positive integers whose sum is equal to a given positive integer is called as?
A	n- queen problem
B	subset sum problem
C	knapsack problem
D	hamiltonian circuit problem
Answer	
Marks	1.5
Unit	5

Id	**126**
Question	Of the following given options, which one of the following is a correct option that provides an optimal solution for 4-queens problem?
A	(3,1,4,2)
B	(2,3,1,4)
C	(4,3,2,1)
D	(4,2,3,1)
Answer	
Marks	1.5
Unit	5

Id	**127**
Question	How many possible solutions exist for an 8-queen problem?
A	100
B	98
C	92
D	88
Answer	
Marks	1.5
Unit	5

Id	**128**
Question	Of the following given options, which one of the following does not provides an optimal solution for 8-queens problem?
A	(5,3,8,4,7,1,6,2)
B	(1,6,3,8,3,2,4,7)
C	(4,1,5,8,6,3,7,2)
D	(6,2,7,1,4,8,5,3)
Answer	
Marks	1.5
Unit	5

Id	**129**
Question	How many nodes are there in a full state space tree with n = 6?
A	65
B	64
C	63
D	62
Answer	
Marks	1.5
Unit	5

Id	**130**
Question	Name the node which has been generated but none of its children nodes have been generated in state space tree of backtracking method.
A	Dead node
B	Live node
C	E-Node
D	State Node
Answer	
Marks	1.5
Unit	5

Id	**131**
Question	A B-tree of order 4 is built from scratch by 10 successive insertions. What is the maximum number of node splitting operations that may take place?
A	3
B	4
C	5
D	6
Answer	
Marks	1.5
Unit	6

Id	**132**
Question	Let X be a problem that belongs to the class NP. Then which one of the following is TRUE?
A	There is no polynomial time algorithm for X.
B	If X can be solved deterministically in polynomial time, then P = NP.
C	If X is NP-hard, then it is NP-complete
D	X may be undecidable.
Answer	
Marks	1.5
Unit	6

Id	**133**
Question	When it would be optimal to prefer Red-black trees over AVL trees?
A	when there are more insertions or deletions
B	when more search is needed
C	when tree must be balanced
D	when log(nodes) time complexity is needed
Answer	
Marks	1.5
Unit	6

Id	**134**
Question	Consider a B-tree in which the maximum number of keys in a node is 5. What is the minimum number of keys in any non-root node?
A	1
B	2
C	3
D	4
Answer	
Marks	1.5
Unit	6

Id	**135**
Question	Why do we impose restrictions like . root property is black . every leaf is black . children of red node are black
A	to get logarithm time complexity
B	to get linear time complexity
C	to get exponential time complexity
D	to get constant time complexity
Answer	
Marks	1.5
Unit	6

Id	**136**
Question	In B-tree n[x] keys are stored in _____ order.
A	decreasing
B	increasing
C	random
D	none of these.
Answer	
Marks	1.5
Unit	6

Id	**137**
Question	The minimum degree of B-tree is _____
A	0
B	1
C	2
D	3
Answer	
Marks	1.5
Unit	6

Id	**138**
Question	Problems that can be solved in polynomial time are known as?
A	intractable
B	tractable
C	decision
D	Complete
Answer	
Marks	1.5
Unit	6

Id	**139**
Question	What are the operations that could be performed in O(logn) time complexity by red-black tree?
A	insertion, deletion, finding predecessor, successor
B	only insertion
C	only finding predecessor, successor
D	only searching
Answer	
Marks	1.5
Unit	6

Id	**140**
Question	Which of the following is the most widely used external memory data structure?
A	AVL tree
B	B- tree
C	RB - tree
D	Binary tree
Answer	
Marks	1.5
Unit	6

Id	**141**
Question	B-tree of order n is a order-n multiway tree in which each non-root node contains _____
A	at most (n – 1)/2 keys
B	exact (n – 1)/2 keys
C	at least 2n keys
D	at least (n – 1)/2 keys
Answer	
Marks	1.5
Unit	6

Id	**142**
Question	Compression techniques can be used on the keys to reduce both space and time requirements in a B-tree.
A	True
B	False
C	
D	
Answer	
Marks	1.5
Unit	6

Id	**143**
Question	Which of the following is true?
A	larger the order of B-tree, less frequently the split occurs
B	larger the order of B-tree, more frequently the split occurs
C	smaller the order of B-tree, more frequently the split occurs
D	smaller the order of B-tree, less frequently the split occurs
Answer	
Marks	1.5
Unit	6

Id	**144**
Question	Let S be an NP-complete problem and Q and R be two other problems not known to be in NP. Q is polynomial time reducible to S and S is polynomial-time reducible to R. Which one of the following statements is true
A	R is NP-complete
B	R is NP-hard
C	Q is NP-complete
D	Q is NP-hard
Answer	
Marks	1.5
Unit	6

Id	**145**
Question	Which of the following statements are TRUE? (1) The problem of determining whether there exists a cycle in an undirected graph is in P. (2) The problem of determining whether there exists a cycle in an undirected graph is in NP. (3) If a problem A is NP-Complete, there exists a non-deterministic polynomial time algorithm to solve A.
A	1, 2 and 3
B	1 and 3
C	2 and 3
D	1 and 2
Answer	
Marks	1.5
Unit	6

Id	**146**
Question	Which of the following is true about NP-Complete and NP-Hard problems.
A	If we want to prove that a problem X is NP-Hard, we take a known NP-Hard problem Y and reduce Y to X
B	The first problem that was proved as NP-complete was the circuit satisfiability problem.
C	NP-complete is a subset of NP Hard
D	All of the above
Answer	
Marks	1.5
Unit	6

Id	**147**
Question	Which of the following statements are TRUE? 1. The problem of determining whether there exists a cycle in an undirected graph is in P. 2. The problem of determining whether there exists a cycle in an undirected graph is in NP. 3. If a problem A is NP-Complete, there exists a non-deterministic polynomial time algorithm to solve A.
A	1, 2 and 3
B	1 and 2 only
C	2 and 3 only
D	1 and 3 only
Answer	
Marks	1.5
Unit	6

Id	**148**
Question	Consider the following two problems of graph. 1) Given a graph, find if the graph has a cycle that visits every vertex exactly once except the first visited vertex which must be visited again to complete the cycle. 2) Given a graph, find if the graph has a cycle that visits every edge exactly once. Which of the following is true about above two problems.
A	Problem 1 belongs NP Complete set and 2 belongs to P
B	Problem 1 belongs to P set and 2 belongs to NP Complete set
C	Both problems belong to P set
D	Both problems belong to NP complete set
Answer	
Marks	1.5
Unit	6

Id	**149**
Question	Which of the following is an application of Red-black trees and why?
A	used to store strings efficiently
B	used to store integers efficiently
C	can be used in process schedulers, maps, sets
D	for efficient sorting
Answer	
Marks	1.5
Unit	6

Id	**150**
Question	Is the following statement valid? A Red-Black Tree which is also a perfect Binary Tree can have all black nodes
A	Yes
B	No
C	
D	
Answer	
Marks	1.5
Unit	6