L.J Institute of Engineering and Technology, Ahmedabad.
Design and Analysis of Algorithms Practice Book - 2024-2025(CE,IT,CSD,AIML,AIDS,CSE,CST,CSIT,CEA Engineering)

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
UNIT 1 - Basics of Algorithm & Analysis								
TOPIC NAME:- Asymptotic notations (MCQs)								
1	1	To verify whether a function grows faster or slower than the other function, we have some asymptotic or mathematical notations, which is_____.	D	1	Omega (Ω),	Theta (θ)	Big Oh (O)	All of the above
2	1	Which Notation is used to find the lower bound of algorithm's running time?	A	1	Omega (Ω),	Theta (θ)	Big Oh (O)	None of the above
3	1	Using asymptotic analysis, we can very well conclude the _____ scenario of an algorithm.	D	1	Average case	Best case	Worst case	All of these
4	1	Let f(n), g(n) be two functions of n. Which of the following statements is correct if $f(n) = n^2 \log n$ and $g(n) = n (\log n)^{10}$	B	1	f(n) = O(g(n)) and g(n) ≠ O(f(n))	g(n) = O(f(n)) and f(n) ≠ O(g(n))	f(n) ≠ O(g(n)) and g(n) ≠ O(f(n))	f(n) = O(g(n)) and g(n) = O(f(n))
5	1	Asymptotic notations are used to represent the _____ of an algorithm	B	1	Property	complexity	Characteristic	Both A & C
6	1	O-notation provides an asymptotic.	A	1	upper bound	Light bound	Lower bound	Hard Bound
7	1	For the following program gives Big O analysis of the running time (in terms of n) For (i=0; i<n; i++) A[i] += 1; Choose the most appropriate answer.	B	1	O(n-1)	O(n)	O(2n)	O(log n)

8	1	For the following program gives Big O analysis of the running time (in terms of n).
		
		For (i=0; i< n; i++)
		For (j=i; j< n; j++)
		For (k=j; k< n; k++)
		S++;
		
		Choose the most appropriate answer.
			C	1	O(n-1)	$O(n^2)$	$O(n^3)$	O(log n)

9	1	Consider the following three claims: I. (n+k)^m=θ(n^m)where k and m are constants II. 2^(n+1)=O(2^n) III. 2^(2n+1)=O(2^n) Which of the following claims are correct?	A	1	I,II	I,III	II,III	I,II,III

10	1	What is the time 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();
		}
		
		Choose the most appropriate answer
			B	1	O(N * M) time	O(N + M) time	O(M*M) time	O(N * N) time

11	1	Find the order of given piece of code:
		
		Algorithm multiply (A, B, n)
		{
		for(i=0; i<n; i++)
		{
		for(j=0; j<n; j++)
		{
		C[i,j]=0;
		for(k=0; k<n; j++)
		{
		C[i,j] = C[i,j] + A[i,k] * B[j,k];
		}
		}}}
			C	1	O(n-1)	$O(n^2)$	$O(n^3)$	O(log n)

12	1	Find out big-oh notation of the f(n)= 8n^3 +5n^2+3n+10	B	1	O (√n)	O (n^3)	O (n log n)	O (n^2)

13	1	Find the order of given piece of code:
		Algorithm add (A, B, n)
		{
		for(i=0; i<n; i++)
		{
		for(j=0; j<n; j++)
		{
		C[i,j] = A[i,j] + B[i,j];
		}
		}
		}
		Choose the most appropriate option.
			D	1	O (√n)	O (n^3)	O (n log n)	O (n^2)

14	1	Find the order of given piece of code:
		p=0;
		for(i=1; i<n; i=i*2)
		{
		p++;
		}
		for(j=1; j<p; j=j*2)
		{
		Statement;
		}
		Choose the most appropriate option
			C	1	O(n)	O(1)	O(logn)	None of the above

15	1	Find the order of given piece of code:
		p=0;
		for(i=1; p<=n; i++)
		{
		p=p+i;
		}
		Choose the most appropriate answer.
			B	1	O (n)	O (√n)	O (n^2)	O (n log n)

16	1	What is the computation time for the following code?
		
		For (i=1 ; i<=n ; i++)
		For (j=1 ; j<= i ; j++)
		c=c+1;
		Choose the most apropriate option.
			B	1	O(n)	O(n^2)	O(logn)	O(nlogn)

17	1	The big-O notation for f(n) = (nlogn + n^2)(n^3 + 2) is?	A	1	O(n^5)	O (√n)	O(n^2)	None of the above
18	1	Find out big-oh notation of the f(n)= 4n^3 +n^2+2n+100	A	1	O(n^3)	O(n^2)	O(n)	None of the above
19	1	Big Oh notation for f(n)=2n^3+ 3n^2 + n + logn is ……..	C	1	O(n^5)	O(n^2)	O(n^3)	O(logn)

20	1	The time complexities of the below mentioned function is:
		a=1;
		while(a<n)
		{
		Statement;
		a=a*2;
		}
			A	1	O(logn)	O(nlogn)	O(n)	O(loglogn)

21	1	The time complexity for log n! is _____.	B	1	Ω(1)	O(nlogn)	Same as log n	Both A and B

22	1	Find the order of given piece of code:
		for(i=n; i> = 1; i=i/2)
		{
		Statement;
		}
		Choose the most appropriate answer.
			A	1	O (logn)	O(nlogn)	O(n^3)	None of the above

23	1	Which one of the following can be considered as worst case in terms of time complexity?	C	1	O(nlogn)	O(n^2)	O(2^n)	O((n^2)logn)

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24	1	With respect to Big Oh notation, find the running time complexity if frequency count is 6n^2+135? Choose the most appropriate one.	D	1	O(n^3)	Ω(n^3)	Ω(1)	O(n^2)
25	1	Find out big-oh notation of the f(n)= 3n^2+5n+10	B	1	O(n)	O(n^2)	O(nlogn)	None of the above
26	1	Arrange the following rate of growth in decreasing order: n log n, n+n^2+n^3, 24, sqrt(n)	A	1	n+n^2+n^3,n log n, sqrt(n), 24	24, n+n2+n3, n log2 n, sqrt(n)	24, n log2 n ,n+n2+n3, sqrt(n)	24, n+n2+n3, sqrt(n), n log2 n
27	1	Find out the correct sequence for given order of time complexity	A	1	1< logn< √n < n < n^2 < n^3	1<n logn< √n < n < n^2 < n^3	1<n logn< √n < 2^n < n^2 < n^3	1< logn< √n < 2^n < n^2 < n^3
28	1	Let f(n), g(n) be two functions of n. Which of the following statements is correct if $f(n) = n^{4\log n}$ and $g(n) = n (\log n)^5$	B	1	f(n) = O(g(n)) and g(n) ≠ O(f(n))	g(n) = O(f(n)) and f(n) ≠ O(g(n))	f(n) ≠ O(g(n)) and g(n) ≠ O(f(n))	f(n) = O(g(n)) and g(n) = O(f(n))

29	1	Consider functions and expressed in pseudocode as follows:
		Function_1
		while $n > 1$ do
		for $i = 1$ to n do
		$x = x + 1$;
		end for
		$n = \lfloor n/2 \rfloor$;
		end while
		Function_2
		for $i = 1$ to $100 * n$ do
		$x = x + 1$;
		end for
		Let f1(n) and f2(n) denote the number of times the statement "x=x+1"is executed in Function_1 and Function_2 respectively. Which of the following statements is/are TRUE?
			D	1	f1(n) ∈Ø(f2(n))	f1(n) ∈O(f2(n3))	f1(n) ∈O(f2(n2))	All of the above

30	1	Obtain the frequency count for the following code
		void fun( )
		{
		int a[3][3],b[3][3],c[3][3],i;
		for(i=0;i<m;i++)
		{
		for(j=0;i<n;j++)
		{
		c[i][j]=a[i][j]+b[j];
		}
			A	1	2m(1+n)+1	2n(m+n)	(m+n)	2m(m+n)

31	1	Find out big-oh notation of the f(n)= 8n^3 +5n^2+3n+10	D	1	O (n)	O (n^2)	O (n log n)	O (n^3)
32	1	What is the Big Oh notation for f(n)=2logn+ n^2 logn?	A	1	O (n)	O (n log n)	O (log n)	O (2log n)
33	1	Which Notation is used to find the upper bound of algorithm's running time?	A	1	Big Oh	Omega	Theta	Small Omega
34	1	Asymptotic analysis is _____ bound.	D	1	Input	Output	Outer	None of above
35	1	Which of following is/are incorrect : I.n^2logn = O(n^2) II.n^2+logn = O(n^2) III.n^2logn = Ω(n^2) IV.n^2logn = θ(n^2)	D	1	Only I	Only II	Only III	Both I and IV
36	1	T (n) = 16T (n/4) + n!	B	1	O(n2)	O(n!)	O(log n!)	O(n log n!)
37	1	Which notation provides an upper bound on the growth rate of a function in algorithm analysis?	A	1	Big-O (O)	Big-Ω (Omega)	Big-Θ (Theta)	Big-Upside Down-A (∧)
38	1	What is an algorithm?	B	1	A programming language	A step-by-step procedure for solving a problem	A data structure	A computer hardware component
39	1	Find the order of given piece of code: for i in range(n): for j in range(m): print(i, j)	D	1	O (n+m)	O(m+1)	O (n^2)	O (n*m)
40	1	What does Big O notation represent in the context of algorithm analysis?	A	1	Worst-case time complexity	Best-case time complexity	Average-case time complexity	None of the above
41	1	Find out big-oh notation of the f(n)= 15n3 +6n2+6n+1+10	C	1	O(n)	O(n^2)	O (n^3)	O(n-1)
42	1	In a competition, six 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: 1.for (i=0; i<n; i++) 2.for (i=0; i<n; i+=2) 3.for (i=1; i<n; i*=2) 4.for (i=n; i<=n; i/= 2) 5.for (i=0; i<n; i-=2) 6.for (i=0; i<n; i+=3) if n is the size of input (positive), which function is most efficient (if the task to be performed is not an issue)?	C	1	1	2	3	4
43	1	Consider the following four claims: I.log2 n ∈ O(n) II.n(n-1)/2 ∈ O(n) III.2n^2 = O(n^3) IV.2n+1 = O (2n) Which of the following claims are incorrect?	B	1	I only	II only	III only	IV only
44	1	Consider the following C function : int fun (int n) { int i,j; for (i=1;i<=n;i++) { for (j=1; j<n; j+=i) { printf("%d %d",i,j); }}} Time complexity of fun in term of θ notation is	A	1	θ(n log n)	θ(log n)	θ (n √n)	θ(n^2)
45	1	What is the Big Oh notation for f(n)=2logn+n^2 logn?	A	1	O(n^2)	O(logn)	Ω(1)	Ω(logn)
46	1	Which of the following is not O(n^2)?	C	1	(15) * n2	(1000) * n2	n^3sqrt(n))	n^2
47	1	Consider the following three claims, which of the following claim(s) is/are correct? I. (n+k) ^m = θ (nm) where k and m are constants II. 2^(n+1) = O (2^n) III. 2^(2n+1) = O (2^n)	D	1	I only	II only	III only	I and II only
48	1	Find out big-oh notation of the f(n)= 16n^3 +9n^2+2n+18	A	1	O (n^3)	O (n log n)	O (log n)	O (n)
49	1	What is the time complexity of following code: i = 1 while i < n: print(i) i = i * 2	A	1	O(logn)	O(n+1)	O(n^2)	O(n)
TOPIC NAME:- Basics of Algorithm (MCQs)								
50	1	Which of the following properties are necessary for an Algorithm?	D	1	Definite ness	correct ness	Effectiveness	Both A and C
51	1	Which of the following statements display "MULTIPLICITY" characteristic of algorithms? (1)We can write an algorithm as a flowchart or as pseudo code or in common English language. (2)An algorithm can have multiple inputs and multiple outputs. (3)An algorithm may use different logical constructs to solve the same problem. (4)An algorithm may solve multiple problems.	C	1	1,2 and 4 only	2 and 4 only	1 and 3 only	1,2,3 and 4
52	1	_____is a step-by-step recipe for solving an instance of problem	A	1	Algorithm	Complexity	Analysis	None of the above
53	1	_____ of an algorithm refers to defining the mathematical boundation/framing of its run-time performance.	B	1	Algorithm	Complexity	Analysis	None of the above
54	1	Which is not a properties of an algorithm?	D	1	Range of Input	Finiteness	Non-ambiguity	None of the above
55	1	The algorithm is defined as collection of _____instruction	A	1	Unambiguous	Repeated	Inifinite	Ambiguous
56	1	Which property of algorithm says that there should be a termination point after performing required operation?	D	1	Non-ambiguity	Speed	Correctness	Finiteness

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57	1	An algorithm is _____?	B	1	A problem	A Procedure for Solving a Problem	A Mathematical Problem	A Pictorial representation
58	1	Which of the following is incorrect? Algorithms can be represented:	C	1	A program	A Flow chart	A syntax	A Pseudo code
59	1	Match the following: 1. Algorithm A. Created by person having domain knowledge 2. Program B. Implementation of strategy C. Dependent on underlying hardware/programming language D. Testing is required E. Analysis is required F. Written as pseudocode	D	1	1-A,B,C,D & 2-E,F	1-A,B.F & 2-C,D,E	1-B,E,F & 2-A,C,D	1-A,E,F & 2-B,C,D
60	1	Where is linear searching used?	C	1	When the list has only a few elements	When performing a single search in an unordered list Used all the time	When the list has only a few elements and When performing a single search in an unordered list	None of these
TOPIC NAME:- Efficiency of an algorithm (MCQs)								
61	1	While searching an element in array linearly, The Worst case occur in the algorithm when_____	B	1	Item is Somewhere in the middle of the array	Item is the last element in the array or not in the array	Item is at second position of the array	Item is First element in the array
62	1	Which of the following case does not exist in complexity theory?	D	1	Best case	Worst case	Average case	Null case
63	1	To main measures of the efficiency of an algorithm are?	A	1	Time and space complexity	Date & Space	Complexity & Capacity	Data & Capacity
64	1	How is time complexity measured?	B	1	By counting the number of algorithms in an algorithm.	By counting the number of primitive operations performed by the algorithm on a given input size.	By counting the size of data input to the algorithm.	None of the above
65	1	Time complexity is defined in terms of	B	1	how many times it takes to run a basics of algorithm, based on the size of the output	how many times it takes to run a given algorithm, based on the length of the input	how many times it takes to run a Code, based on the size of the output	how many day it takes to run a Code, based on the size of the output
66	1	The time complexity of an algorithm is the amount of time it takes for each _____ to complete	C	1	output	input	statement	variable
67	1	The amount of memory used by a program to execute it is represented by its _____	D	1	Time Complexity	Size Complexity	Length Complexity	space complexity
68	1	The term _____ measures how many steps are required by the algorithm to solve the given problem	A	1	algorithm complexity	algorithm length	algorithm output	algorithm input
69	1	What is the significance of Efficiency Analysis From below?	D	1	By computing time complexity, we come to know whether algorithm is slow or fast	By computing space complexity, we come to know whether program is fast or slow	By computing space complexity, we can analyze whether an algorithm requires more or less space	Both A & C are correct
TOPIC NAME:- Efficiency of an algorithm(Algorithm)								
70	1	Write an algorithm for implementing the Linear Search.		1				

71	1	Find time complexities of the above-mentioned functions.
		Function_1
		while $n > 1$ do
		for $i = 1$ to n do
		$x = x + 1$;
		end for
		$n = \lfloor n/2 \rfloor$;
		end while
		Function_2
		for $i = 1$ to $100 * n$ do
		$x = x + 1$;
		end for
				2				

UNIT 2 - Sorting Techniques								
TOPIC NAME:- Sorting (MCQs)								
72	2	Which of the following sorting procedure is the slowest ?	A	1	Bubble Sort	Quick Sort	Heap Sort	Shell sort
73	2	A sort which compares adjacent elements in a list and switches where necessary is _____.	D	1	Insertion Sort	Quick sort	Heap Sort	Bubble Sort
74	2	Which of the following sorting algorithms has the lowest worst-case complexity?	D	1	Bubble Sort	Insertion sort	Heap Sort	Counting Sort
75	2	You have to sort a list L consisting of a sorted list followed by a few “random” elements. Which of the following sorting methods would be especially suitable for such a task?	D	1	Bubble Sort	Selection Sort	Quick Sort	Insertion Sort
76	2	A sort which iteratively passes through a list to exchange the first element with any element less than it and then repeats with a OLD first element is called _____	B	1	Insertion Sort	Selection Sort	Heap Sort	Quick Sort
77	2	The way a card game player arranges his cards as he picks them one by one can be compared to _____.	C	1	Quick Sort	Merge Sort	Insertion Sort	Bubble Sort
78	2	Which among the following is the best when the list is already sorted _____.	A	1	Insertion Sort	Bubble Sort	Merge Sort	Selection Sort
79	2	Which sorting algorithm will take least time when all elements of input array are identical? Consider typical implementations of sorting algorithms	A	1	Insertion Sort	Bubble Sort	Heap Sort	Counting Sort
80	2	What is stable sorting?	C	1	Algorithm in which only 1 array is used	Algorithm which gives same output for all input values	Algorithm in which duplicate elements remain in same relative position after sorting.	Algorithms which execute in finite amount of time
81	2	Which of the following sorting technique is not stable?	B	1	Insertion sort	Selection Sort	Counting Sort	None of these
82	2	What is in-place sorting?	B	1	Multiple arrays are used	Transforms the input without using any extra memory	Gives same output for all input values	Duplicate elements remain in same relative position
83	2	Which of the following are not stable sorts? Tick all the correct options if more than one are stable.	C	1	Insertion Sort	Counting Sort	Selection Sort	Bubble Sort
TOPIC NAME:- Bubble Sort (MCQs)								
84	2	How many passes are required to sort a file of size N by bubble sort method?	C	1	2N	N	N-1	N/2
85	2	The worst-case time complexity of Bubble Sort is_____	A	1	$O(n^2)$	O(log n)	O(n)	O(n logn)
86	2	How many swaps are needed for sorting the numbers 5, 21, 1, 10, 31, 3, 12 in ascending order, using bubble sort?	A	1	9	10	11	12
87	2	The number of swappings needed to sort the numbers 8, 22, 7, 9, 31, 5, 13 in ascending order, using bubble sort is	D	1	11	12	13	14
88	2	What is the main drawback of the Bubble Sort algorithm?	B	1	It is not stable	It has a high time complexity	It is not comaprision based	All of above
89	2	What is Worst, Average and Best-case time complexity of Bubble sort algorithm respectively?	C	1	O(n), Θ (n^2), Ω (n)	O(n^3), O(n^2), O(n)	O(n^2), O(n^2), O(n)	O(n^3), O(n^3), O(n^3)
90	2	What is the time complexity of the Modified Bubble Sort algorithm in the worst-case scenario?	B	1	O(n)	O(n^2)	O (n^3)	O(n-1)
TOPIC NAME:- Bubble Sort (Examples)								
91	2	Sort the letters of word “DESIGN” in alphabetical order using bubble sort.		3				
92	2	What is the average case time complexity of bubble sort?		1				
93	2	Sort the letters of word “LJUNIVERSITY” in alphabetical order using bubble sort.		2				
94	2	Explain Bubble sort algorithm.		4				
95	2	Derive the algorithmic complexity of Bubble sort.		4				
96	2	Derive the algorithmic complexity of bubble sort in worst case. Is bubble sort in place (Answer in yes/no)? Is bubble sort stable (Answer in yes/no)?		2				
97	2	Write bubble sort algorithm for descending order sort. Analyze its complexity.		2				
98	2	Derive the algorithmic complexity of bubble sort in worst case. Is bubble sort in place (Answer in yes/no)? Is bubble sort stable (Answer in yes/no)?		2				
99	2	Write algorithm for bubble sort. Apply bubble sort on the following data: 64, 12, 80, 34, 56, 17, 47, 73		3				
TOPIC NAME:- Counting Sort (MCQs)								

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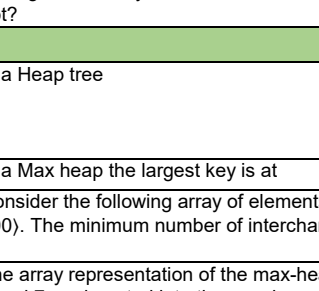
100	2	Counting sort performs …….. Numbers of comparisons between input elements	A	1	0	n	n log n	n^2
101	2	How many comparisons will be made to sort the array arr={8,8,7,6,3,3,3,1,2,4,6,1,3,4,2,1,4} using counting sort?	D	1	15	10	8	0
102	2	How many comparisons will be made to sort the array arr={27,8,7,32,5,6,9,20,15,26} using counting sort?	D	1	5	9	7	0
103	2	Find cumulative-count array values for array given below, using COUNTING SORT. 0 4 2 2 0 0 1 1 0 1 0 2 4 2	D	1	2,0,4,3,5	3,3,4,2,0	5,3,4,0,2	None of these
104	2	How many comparisons will be made to sort the array arr= {1,4,5,2,1,3,4,2,1} using counting sort?	C	1	2	4	0	5
105	2	How many comparisons will be made to sort the array arr={27,8,7,32,5,6,9,20,15,26} using counting sort?	D	1	7	3	2	0
TOPIC NAME:- Counting Sort (Examples)								
106	2	Sort the following numbers using counting sort. 1,4,1,2,7,5,2		2				
107	2	Sort the following numbers using counting sort. 10, 7, 12, 4, 9, 13		2				
108	2	Apply counting sort for the following numbers to sort in ascending order 4, 1, 3, 1, 3		3				
109	2	Write counting sort algorithm. Derive its time complexity in worst case.		4				
110	2	Sort the following numbers using counting sort. 1, 3, 2, 8, 5, 1, 5, 1, 2, 7		2				
111	2	Sort the following numbers using counting sort. 1, 3, 2, 4, 1, 2, 4, 3		3				
112	2	Write Algorithm of non-comparative, stable, non-necessarily in-place sort for sorting numerical elements in ascending order.		2				
113	2	a) Sort the following numbers using counting sort. 1, 3, 2, 4, 5, 6, 3, 2, 1, 4, 6, 3 b) Derive the algorithmic complexity of bubble sort.		3				
114	2	Sort the following numbers using counting sort. 7, 3, 1, 8, 5, 1, 3, 1, 2, 7		2				
115	2	Write counting sort algorithm to arrange any given items into ascending order and sort the following numbers using counting sort, specifying all the needed steps. 3,6,4,1,3,4,1,4,2		4				
116	2	Apply counting sort for the following numbers to sort in ascending order 2, 2, 7, 4, 1, 7, 4, 3		2				
117	2	Do Algorithm analysis for selection sort. Also mention if selection sort is stable or not?		2				
TOPIC NAME:- Heap Sort (MCQs)								
118	2	In a Heap tree	B	1	Values in a node is greater than every value in left sub tree and smaller than right sub tree	Values in a node is greater than every value in children of it	Both of above conditions applies	none of above conditions applies
119	2	In a Max heap the largest key is at	A	1	the root	the leaf	internal node	None of the above
120	2	Consider the following array of elements. ⟨89, 19, 50, 17, 12, 15, 2, 5, 7, 11, 6, 9, 100⟩. The minimum number of interchanges needed to convert it into a max-heap is:	C	1	1	2	3	4
121	2	The array representation of the max-heap is 10, 8, 5, 3, and 2. Two new elements 1 and 7 are inserted into the max-heap in that order. After the insertion of the elements max-heap is	A	1	10, 8, 7, 3, 2, 1, 5	10, 8, 7, 2, 3, 1, 5	10, 8, 7, 1, 2, 3, 5	10, 8, 7, 5, 3, 2, 1
122	2	Consider a max heap, represented by the array 40, 30, 20, 10, 15, 16, 17, 8, 4. Now consider that a value 35 is inserted into this heap. After insertion, the new max-heap is:	B	1	40, 30, 20, 10, 15, 16, 17, 8, 4, 35	40, 35, 20, 10, 30, 16, 17, 8, 4, 15	40, 30, 20, 10, 35, 16, 17, 8, 4, 15	40, 35, 20, 10, 15, 16, 17, 8, 4, 30
123	2	In what time can a binary heap be built?	A	1	O(n)	O(n^2)	O(nlogn)	None of the above
124	2	What is Worst, Average and Best-case time complexity of Heap sort algorithm respectively?	D	1	O(nlogn), Θ (logn), Ω (n)	O(nlogn), O(logn), O(n)	O(logn), O(logn), O(logn)	O(nlogn), O(nlogn), O(nlogn)
125	2	Which Statement is correct For Heap tree from the given below? I.Values in root is greater than value in left sub tree and smaller than right sub tree II.Value in each node is greater than or equal to the value stored in children of it. III. Each level of tree is completely filled, except possibly the bottom level	C	1	I	I,II	II,III	I,II,III
126	2	Consider the following heap after buildheap phase. What will be its corresponding array? (Want to do ascending order sorting)	D	1	26,53,41,97,58,59,31	26,31,41,53,58,59,97	26,41,53,97,31,58,59	97,53,59,26,41,58,31
127	2	Consider the following array of elements. ⟨88, 19, 51, 17, 12, 15, 2, 5, 7, 11, 6, 9, 101⟩. The minimum number of interchanges needed to convert it into a max-heap is:	B	1	2	3	4	5
128	2	Which one of the following sequences when stored in an array with locations A[1],...,A[10] forms a max-heap?	B	1	23, 17, 10, 6, 13, 14, 1, 5, 7, 12	23, 17, 14, 7, 13, 10, 1, 5, 6, 12	23, 17, 14, 6, 13, 10, 1, 5, 7, 15	23, 14, 17, 1, 10, 13, 16, 12, 7, 5
129	2	Suppose we are sorting an array of seven integers using heapsort, and we have just finished some heapify (either maxheapify or minheapify) operations. The array now looks like this: 16 14 15 10 12 27 28. How many heapify operations have been performed on root of heap?	C	1	3	2	n	6
130	2	Consider the following array of elements 289, 219, 250, 217, 212, 215, 22, 25, 27, 211, 26, 29, 300. What is the minimum number of swaps required to convert it in to max-heap?	A	1	3	5	7	6
131	2	The essential part of Heap sort is construction of max-heap. Consider the tree shown below, the node 24 violates the max-heap property. Once heapify procedure is applied to it, which position will it be in? 	D	1	3	8	4	9
TOPIC NAME:- Heap Sort (Examples)								
132	2	Sort the following data using Heap sort method. 65, 77, 5, 25, 32, 45, 99, 83, 69, 81		3				
133	2	Write down the Best case, Worst Case and Average case Complexity for Heap sort.		1				
134	2	Sort the following data with Heap Sort Method: 65, 75, 5, 55, 25, 30, 90, 45, 80.		3				
135	2	Sort the following data with Heap Sort Method: 20, 50, 30, 75, 90, 60, 25, 10, 40.		3				
136	2	Sort the following numbers using heap sort. 20, 10, 50, 40, 30		3				
137	2	Arrange the following data into ascending order using heap sort. Make necessary assumptions if required. 34, 12, 42, 96, 56, 11, 78		3				
138	2	Sort the following numbers using heap sort. 30, 21, 55, 16, 19, 17, 34		3				
139	2	Sort the following data in ascending order using heap sort. Write all the necessary steps. 43, 34, 11, 56, 23, 90		3				
140	2	Write an algorithm for Heap sort.		3				
141	2	Write down Max-Heapify Algorithm also write down the best case, worst case and average case time complexity of heap sort.		3				
142	2	Sort the following data using Heap sort method. (Shown all steps of tracing) 71, 69, 9, 11, 14, 56, 44, 22		3				
143	2	Write down Max-Heapify Algorithm and complexity of it.		2				
144	2	Write down Max-Heapify Algorithm.		3				

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
145	2	Sort the following data using Heap sort method. (Shown all steps of tracing) 81, 89, 9, 11, 14, 76, 54, 22		2				
146	2	Sort the following array using heap sort in ascending order:[11,44,55,66,22,77,33]		2				
147	2	Write an algorithm for MAX HEAPIFY. Also write heapsort is inplace or not?		3				
148	2	a) Sort the following numbers using heap sort. 20, 10, 50, 40, 30, 70 b) Write down the algorithm of Insertion Sort. Also write insertion sort is in-place and stable or not?		4				
149	2	Write down Max-Heapify Algorithm used in Heap Sort. Write the best case, worst case and average case time complexity of Bubble sort.		3				
150	2	Sort the following data into ascending order using Heap sort method(Shown all steps of tracing) 8, 3, 2, 7, 9, 1, 4 Write an algorithm for max-heapify		4				
TOPIC NAME:- Insertion Sort (MCQs)								
151	2	Consider an array of length 5, arr[5] = {9,7,4,2,1}. What are the steps of insertions done while running insertion sort on the array?	D	1	79421 24791 4792 1 12479	79421 47921 1479 2 12479	97412 79214 4792 1 12479	79421 47921 2479 1 12479
152	2	The average case complexity of insertion sort is _____	A	1	O(n^2)	O(n)	O(log n)	O(n log n)
153	2	Select the correct Best & worst-case complexity of “Insertion Sort” respectively.	C	1	O(n^2) , O(log n)	O(log n) , O(n^2)	O(n) , O(n^2)	O(1) , O(n)

154	2	Select the correct algorithm for “Insertion Sort”	A	1	a) Insertion_Sort(A[0…n-1])
					{
					for i ← 1 to n-1 do
					{
					temp ← A[i]
					j ← i-1
					while j>=0 and A[j]>temp
					do
					{
					A[j+1] ← A[j]
					j ← j-1
					}
					A[j+1] ← temp
					}
					}
						b) Insertion_Sort(A[0…n-1])
						{
						for i ← 1 to n-1 do
						{
						temp ← A[i]
						j ← j-1
						while j>=0 and A[j]>temp
						do
						{
						A[j+1] ← A[j]
						j ← j-1
						}
						A[j+1] ← temp
						}
						}
							c) Insertion_Sort(A[0…n-1])
							{
							for i ← 1 to n-1 do
							{
							temp ← A[i]
							j ← i-1
							while j>=0 and A[j]>temp
							do
							{
							A[j+1] ← A[j]
							j ← j-1
							}
							A[j] ← temp
							}
							}
								d) Insertion_Sort(A[0…n-1])
								{
								for i ← 1 to n-1 do
								{
								temp ← A[i]
								j ← i-1
								while j>=0 do
								{
								A[j+1] ← A[j]
								j ← j-1
								}
								A[j+1] ← temp
								}
								}

155	2	For the following question, how will the array elements look like after second pass in insertion sort? 34, 8, 64, 51, 32, 21	D	1	8, 21, 32, 34, 51, 64	8, 32, 34, 51, 64, 21	8, 34, 51, 64, 32, 21	8, 34, 64, 51, 32, 21
TOPIC NAME:- Insertion Sort (Examples)								
156	2	Write an insertion sort algorithm to arrange n items into ascending order.		3				
157	2	Sort the letters of word “EDUCATION” in alphabetical order using insertion sort.		3				
158	2	Write an java Program function code for insertion sort to do sorting array in descending order.		3				
159	2	Write an insertion sort algorithm to arrange n items into ascending order and sort the following numbers using insertion sort. 4,3,2,10,12,1,5,6		4				
160	2	Write a java function for performing insertion sort.		2				
161	2	Sort given array A = {27, 46, 11, 95, 67, 32, 78} using insertion sort algorithm.		4				
162	2	Write an insertion sort algorithm to arrange n items into descending order. After that sort the following given sequence in descending order by using insertion sort (Show all passes of tracing) 3, 9, 6, 5, 23, 14, 2, 7, 1		4				
163	2	Write down Algorithm for insertion sort. Is this algorithm stable? Is the algorithm in place?		3				
164	2	Write down the best case, worst case and average case time complexity of insertion sort. Sort the following data in ascending order using heap sort. Write all the necessary steps. 12, 11, 13, 5, 6, 7, 14		4				
165	2	Sort given array A = {4,3,6,2,5,1} using insertion sort algorithm.		2				
TOPIC NAME:- Selection Sort (MCQs)								

166	2	Select the correct algorithm for “Selection Sort”	A	1	Algorithm Selection_Sort(A[0…n-1)
					{ for i = 0 to n-2 do
					{ min ← i
					for j=i+1 to n-1 do
					{ if A[min] > A[j] then
					min ← j
					}
					swap(A[i], A[min])
					}
					}
						Algorithm Selection_Sort(A[0…n-1)
						{ for i = 0 to n-1 do
						{ min ← i
						for j=i+1 to n do
						{ if A[min] > A[i] then
						min ← j
						}
						swap(A[i], A[min])
						}
						}
							Algorithm Selection_Sort(A[0…n-1)
							{ for i = 1 to n do
							{ min ← i
							for j=i+1 to n do
							{ if A[min] < A[j] then
							min ← j
							}
							swap(A[i], A[min])
							}
							}
								Algorithm Selection_Sort(A[0…n-1)
								{ for i = 0 to n-2 do
								{ i ← min
								for j=i+1 to n-1 do
								{ if A[min] < A[j] then
								min ← j
								}
								swap(A[min], A[i])
								}
								}

167	2	On completion of 3 passes of selection sort, what will be the arrangement of following elements 67,89,12,56,27,54,32,18	D	1	12,18,67,56,27,54,32,89	12,18,27,32,67,54,56,89	12,18,67,54,27,56,32,89	12,18,27,56,67,54,32,89
168	2	Consider a situation where swap operation is very costly. Which of the following sorting algorithms should be preferred so that the number of swap operations are minimized in general?	B	1	Bubble Sort	Selection Sort	Merge Sort	Counting Sort
169	2	Which of the following statement is/are true for Selection Sort? Statement I : Selection sort divide the array into two parts Statement II : The Sorted part is at the Left end Statement III : The Sorted part is at the Right end Statement IV: The Smallest Element is Selected from Unsorted Array & swapped with leftmost element	B	1	I,II,III	I,II,IV	I,III,IV	I,II,III,IV
TOPIC NAME:- Selection Sort (Examples)								
170	2	Write down the Best case, Worst Case and Average case Complexity for selection sort		1				
171	2	Sort the following numbers using Selection Sort. 20,50,80,40,60,10,30		2				
172	2	Do Algorithm analysis for selection sort and find complexity for the average case.		2				
173	2	Sort the following numbers using Selection Sort.20,70,80,40,60,10,90.Is selection sort in place(Answer in yes/no)? Is selection sort stable(Answer in yes/no)?		3				
174	2	Write an algorithm of Selection Sort Method		3				
UNIT 3 - Solving Recurrence								
TOPIC NAME:-Recurrence relation (MCQs)								
175	3	The complexity of Fibonacci series is:	A	1	O(2^n)	O(n+1)	O(n^2)	O(logn)

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D

176	3	Tower of Hanoi is a mathematical puzzle where we have three rods and n disks. The objective of the puzzle is to move the entire stack to another rod, obeying the following simple rules:
		1. Only one disk can be moved at a time.
		2. Each move consists of taking the upper disk from one of the stacks and placing it on top of another stack i.e. a disk can only be moved if it is the uppermost disk on a stack.
		3. No disk may be placed on top of a smaller disk
		The pseudo code for this problem is as shown below.
		START
		Procedure Hanoi(disk, source, dest, aux)
		IF disk == 1, THEN
		move disk from source to dest
		ELSE
		Hanoi(disk - 1, source, aux, dest) // Step 1
		move disk from source to dest // Step 2
		Hanoi(disk - 1, aux, dest, source) // Step 3
		END IF
		
		END Procedure
		STOP
		What is the recurrence relation for the above given algorithm considering n number of disks?
			B	1	T(n) = T(n-1) + 1	T(n) = 2T(n-1) + 1	T(n) = 2T(n-1) + n	T(n) = T(n/2) + 1

TOPIC NAME:-recurrence relation (Examples)								
177	3	Evaluate the recurrence equation: T(0) = 1 T(n) = 2T(n - 1) + 1, n > 1		2				
TOPIC NAME:- Substitution Method (MCQs)								
178	3	The running time of an algorithm is represented by the following recurrence relation: if n <= 3 then T(n) = n else T(n) = T(n/3) + cn	A	1	O(n)	O(loglogn)	O(log(n+1))	O(logn)
179	3	Consider a recurrence relation T(n) = T(n−1) + 1 T(0) = 0 What is the complexity of T(n) using Forward Substitution Method?	C	1	O(n log n)	$O(n^3)$	O(n)	$O(n^2)$
TOPIC NAME:- Substitution Method (Examples)								
180	3	What is recurrence? Solve recurrence equation T(n) =T (n-1) + n using forward substitution and backward substitution method		5				
181	3	Solve the following recurrence relation using substitution method. T(n) = 2T(n/2) + n. Here T(1) = 1		5				
182	3	Solve the following recurrence relation using substitution method. T(n) = T(n-1) + 1 Here T(0) = 0		2				
183	3	Solve the following recurrence relation using Backward Substitution method T(n)= 4, if n=1 T(n) = 2T(n/2) + 4n, else		2				
184	3	Find the time complexity given the following recurrence relation using Backward Induction: T(n)=T(n/2)+n where n>1 and T(n)=1 where n=1.		3				
185	3	Solve the following recurrence relation using Backward Substitution method T(n)= 4, if n=1 T(n) = 2T(n/2) + 4n		3				
186	3	Evaluate the recurrence equation using backward substitution method and write worst case time complexity. T(0) = 1 T(n) = 2T(n - 1) + 1, n > 1		2				
187	3	T(n) = 3T(n/3) + nUsing Backward substitution		1.5				
188	3	Solve the following recurrence relation using Backward Substitution method T(n)= 1, if n=1 T(n) = 2T(n-1),		2				
189	3	Solve the following recurrence relation using substitution method.T(n) = n*T(n-1) if n>1. Here T(1) = 1, if n=1.		2				
190	3	Solve the following recurrence relation using forward substitution method. T(n) = 2T(n/2) + n. Here T(0) = 1		2				
191	3	Solve the following recurrence relation using Backward Substitution method T(n)= 1, if n=1 T(n) = 2T(n-1)		2				
192	3	Solve the following recurrence relation using Backward Substitution method and write worst case time complexity. T(n) = T(n-1) + n T(0) = 0		3				
193	3	Using backward substitution method solve this. T(n) = T(n-1) + n Where T(n) = 0 , for n>0		2				
194	3	Solve the following recurrence relation using Backward substitution T(n) = T(n-1) + logn T(1) = 1		4				
TOPIC NAME:- Master Method (MCQs)								
195	3	Which are the minimum values of a and b in T(n) = aT(n/b) + f(n), for Master's method?	A	1	a = 1, b = 2	a = 2, b = 2	a = 2, b = 1	a = 1, b = 1
196	3	How many cases are there under Master's theorem?	B	1	2	3	4	5
197	3	What is the result of the recurrences which fall under first case of Master's theorem (let the recurrence be given by T(n)=aT(n/b)+f(n) and f(n)=nc?	A	1	$T(n) = O(n^{\log_b a})$	$T(n) = O(n^c \log n)$	T(n) = O(f(n))	$T(n) = O(n^2)$
198	3	What is the result of the recurrences which fall under second case of Master's theorem (let the recurrence be given by T(n)=aT(n/b)+f(n) and f(n)=nc?	B	1	$T(n) = O(n\log_b a)$	$T(n) = O(n^c \log n)$	T(n) = O(f(n))	$T(n) = O(n^2)$
199	3	What is the result of the recurrences which fall under third case of Master's theorem (let the recurrence be given by T(n)=aT(n/b)+f(n) and f(n)=nc?	C	1	$T(n) = O(n\log_b a)$	$T(n) = O(n^c \log n)$	T(n) = O(f(n))	$T(n) = O(n^2)$
200	3	Which case of master's theorem can be extended further?	B	1	1	2	3	No Case can be extended
201	3	What is the complexity of T(n)= 16T(n/4)+ 5n^3 using Master's Method?	B	1	O(n log n)	$O(n^3)$	O(n)	$O(n^2)$
202	3	Master's theorem is used for?	A	0.5	solving recurrences	solving iterative relations	Solving loop with log n functions only	calculating the time complexity of any code
203	3	Consider the recurrence relation T(n) = 7T(n/7) +n. What is the asymptotic behavior of T(n)?	B	1	O(n)	O(n log n)	O(n^2)	O(2n)
204	3	Consider the recurrence relation T(n) = 2T(n/2) +n, where T(1)=1. What is the asymptotic behavior of T(n)?	B	1	O(n)	O(n log n)	O(n^2)	O(√n)
205	3	What is the result of the recurrences which fall under second case of Master's theorem (let the recurrence be given by T(n)=aT(n/b)+f(n) and f(n)=n^c)?	B	1	T(n) = O(nlogba)	T(n) = O((n^c) log n)	T(n) = O(1)	T(n) = O(f(n))
TOPIC NAME:- Master Method (Examples)								
206	3	Solve following recurrence using master method T(n) = T(2n/3) + 1		5				
207	3	Solve following recurrence using master method T(n) = 9T(n/3) +n		5				
208	3	With using Master's Theorem Solve the recurrence T(n) = 8T(n/4) + 5n^3		2				
209	3	Solve given below recurrence relation using master's theorem. (i) T(n) = 3T (n/4) + n logn (ii) T(n)=2T(n/2)+n*((logn)^2)		3				
210	3	Solve given below recurrence relation using master's theorem. (i) T(n) = 9T(n/3) + n^3 (ii) T(n) = 4T (n/2) + nlogn		3				
211	3	Can we find average case running time for T(n)=T(n/2) +1 recurrence relation using Master's method? if yes then show the solution otherwise use appropriate method to solve it.		2				

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
212	3	Solve the following recurrence relation using Master's method 1.T(n)=4T(n/2)+n 2.T(n)=2T(n/2)+nlogn		2				
213	3	Solve the following recurrence relations using master's method: a) T(n) = 2048T(n/2) + (n^10)*logn b) T(n) = T(n/2) + n^(1/8) c) T(n) = 9T(n/3) + (n^2)((logn)^3)		3				
214	3	Find the time complexity using Master's theorem for the following Function: T(n)=8T(n/2)+n		2				
215	3	Solve given below recurrence relation using master's theorem. (i) T(n) = 8T(n/2) + n3 (ii) T(n) = 4T (n/2) + n3 / logn		3				
216	3	Solve the following recurrence relations using master's method: a) T(n) = 2048T(n/2) + (n10)*logn b) T(n) = 9T(n/3) + (n2)((log3 n)		3				
217	3	T(n) = √2T(n/2) + logn Solve the following using master's method tree method		1.5				
218	3	Solve given below recurrence relation using master's theorem. (i) T(n) = 512T(n/2) + n2 (ii) T(n) = 8T (n/2) + n3 / log3n		3				
219	3	Write an algorithm of selection sort method. Is it stable? Solve given below recurrence relation using master's theorem. (i) T(n) = 8T(n/2) + n3 (ii) T(n) = 4T (n/2) + n3 / logn		4				
220	3	Solve given below recurrence relation using master's theorem. (i)T(n) = 12T(n/2) + 7n3 (ii)(ii) T(n) = 4T(n/4) + nlogn		3				
221	3	Solve the following recurrence relations using master's method: a) 27T(n/3) + n^2 log n b) 2T(n/2) + n / log n		3				
222	3	a) Calculate the complexity of T(n)= 16T(n/4)+ 5n^3 using Master's Method. b) Calculate the complexity of T(n)= 3T(n/2)+ (n^2)/logn using Master's Method.		3				
TOPIC NAME:-Recurrence Tree (MCQs)								
223	3	Which of the following technique is not used for solving recurrence equation?	C	1	Forward Substitution Method	Recurrence tree Method	Greedy Method	Backward Substitution Method
224	3	Which are the minimum values of a and b in T(n) = aT(n/b) + f(n), for recurrence tree method?	B	1	a = 1, b = 2	a = 2, b = 2	a = 2, b = 1	a = 1, b = 1
225	3	The recurrence equation T(0) = 1 T(n) = 2T(n - 1) + 1, n > 1 evaluates to	C	1	2^{n-1}- n - 2	2^{n+1}- n - 2	2^{n+1} -1	2^{n+1} - 2

226	3	Recurrence equation for given algorithm is:
		int algo(int k, int n)
		{
		int x,y;
		if(n<=1)
		{
		return 0;
		}
		else
		{
		for(int i=0;i<n;i++)
		{
		k=k+i;
		}
		x=algo(k, n/2);
		y=algo(n-k, n/2);
		return (x+y);
		}}
			D	1	T(n)=1 (For n<=1),
					T(n)=2T(n/2)+1
						T(n)=1 (For n<=1),
						T(n)=2T(n/2)+2
							T(n)=n (For n<=1),
							T(n)=T(n/2)+2
								T(n)=1 (For n<=1),
								T(n)=2T(n/2)+n

227	3	Which are the minimum values of a and b in T(n) = aT(n/b) + f(n), for Masters method?	A	1	a = 1, b = 2	a = 2, b = 2	a = 1, b = 1	a = 2, b = 3

228	3	The complexity of given recursive code:
		def fibonacci(n):
		if n <= 1:
		return n
		else:
		return fibonacci(n-1) + fibonacci(n-2)
			B	1	O(n^2)	O(2^n)	O(log n)	O(log n)

229	3	The complexity of given recursive code: def XYZ(n):
		if n <= 1:
		return n
		else:
		return XYZ(n-1) + XYZ(n-2)
			B	1	O(n^2)	O(2^n)	O(log n)	O(n log n)

TOPIC NAME:-Recurrence Tree (Examples)								
230	3	Solve following recurrence using recursion tree method: T(n) = 3T(n/3) + n^3		7				
231	3	Use Iteration method to solve recurrence T(n) = T(n-1) + 1 , here T(1)= Θ(1).		7				
232	3	Solve following recurrence relation using suitable method and express your answer using Big-oh (O) notation. T(n) = 2 T(n/2) + n^2		7				
233	3	Solve following recurrence relation using recurrence tree method and express your answer using Big-oh (O) notation. T(n) = T(n/3) + T(2n/3) + Θ(n)		7				
234	3	Solve the following recurrence relation using recursion tree method- T(n) = 2T(n/2) + n		3				
235	3	Solve following recurrence using recursion tree method: T(n) = 2T(n/2) + Cn		2				
236	3	Solve following recurrence relation using recurrence tree method and express your answer using Big-oh (O) notation. T(n) = T(n/3) + T(2n/3) + n2		2				
237	3	Solve following recurrence relation using suitable method with pictorial representation of iteration and express your answer using Big-oh (O) notation. T(n) = T(n/5) + T(4n/5) + n		3				
238	3	Solve the following recurrence relation using Recursion Tree method: T(n) = T(n/4) + T(3n/4) + n		3				
239	3	Solve following recurrence using : (I) tree method: T(n) = 3T(n/3) + n3 (II) master's theorem. T(n) = 8T(n/2) + n3 (III) Backward Substitution method T(n) = 2T(n/2) + 4n, T(n)= 4, if n=1		4				
240	3	Solve following recurrence using recursion tree method: T(n) = T(n/10) + T(9n/10) + cn		3				
241	3	Solve following recurrence tree: (i)T(n) = 2T(n/2) + n2.		3				
242	3	Write down the standard formula, required variables and pre-requisite conditions for Recurrence Tree method. Also find the solution for recurrence relation T(n) = 2T(n/2) + Kn by building the required tree		3				
243	3	Solve the following recurrence relation using Recursion Tree method: T(n) = T(n/10) + T(9n/10) + n		3				
244	3	Solve following recurrence relation using recurrence tree method and express your answer using Big-oh (O) notation. T(n) = T(n/10) + T(9n/10) + n		2				
245	3	Solve following recurrence relation using suitable method with pictorial representation of iteration and express your answer using Big-oh (O) notation. T(n) = T(n/5) + T(4n/5) + n		2				

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
246	3	Solve the following recurrence relation using Recursion Tree method: T(n) = T(n/4) + T(3n/4) + n		3				
UNIT 4- Divide and Conquer Method								
TOPIC NAME:- Binary Search (MCQs)								
247	4	What is the Best case worst case and average case time complexity of binary search?	D	1	O(1) , O(log n) , O(n logn)	O(n) , O(log n) , O(n^2)	O(1), O(log n), O(n)	O(1), O(log n), O(log n)
248	4	which is the correct recurrence relation of binary search?	C	1	T(n) = T(n/2) + T(n/2) + n3	T(n) = T(n/2) + 2T(n/2) + 1	T(n)= T(n/2)+1	T(n) = T(n/2) + T(n/2) + n2
249	4	The minimum number of comparisons for a particular record (in worst case) among 32 sorted records through binary search method will be	C	1	16	8	5	2
TOPIC NAME:- Binary Search (Algorithm, Tracing, Program)								
250	4	How divide and conquer approach work?		3				
251	4	Analyze Binary search algorithm in best and worst case		4				
252	4	Demonstrate Binary Search method to search Key = 14, form the array A=<2,4,7,8,10,13,14,60>		2				
253	4	Explain Technique for Binary Search Method. What is the complexity of Binary Search Method		3				
254	4	Apply Binary search method to search key=60 from given list<10,20,30,40,50,60,70>		5				
255	4	Demonstrate binary search method to find a key=16 from the given array A = <4, 6, 9, 10, 12, 15, 16, 62>		2				
256	4	Apply Binary search method to search key=60 from given list<10,20,30,40,50,60,70>.		1				
257	4	Apply Binary search method to search key=60 from given list<10,20,30,40,50,60,70>. Which complexity case (Best/Worst/Average) is applicable in the above mentioned example? Derive Time Complexity by for the same case.		4				
258	4	Apply Binary search method to search key=66 from given list <11,27,29,50,66,70,93>.		2				
259	4	Apply Binary search method to search key=61 from given list <15,27,39,50,61,70,84>		2				
TOPIC NAME:- Merge Sort (MCQs)								
260	4	A list of n strings, each of length n, is sorted into lexicographic order using the merge-sort algorithm. The worst case running time of this computation is	B	1	O(nlogn)	O(n^2logn)	O(n^2+logn)	O(n^2)
261	4	How many calls of merge-sort are performed when sorting an array of size 64 Base case is an array containing a single element.	C	1	2^63	127	63	64
262	4	Let P be a quicksort program to sort numbers in ascending order. Let t1 and t2 be the time taken by the program for the inputs [1 2 3 4 5] and [4 1 5 3 2], respectively. Which of the following holds?	B	1	t1 = t2	t1 > t2	t1 < t2	t1 = t2 + 5 log5
263	4	Given two sorted list of size 'm' and 'n' respectively. The number of comparisons needed in the worst case by the merge sort algorithm will be :	D	1	m*n	max(m,n)	min(m,n)	m+n-1

264	4	Choose the correct code for merge sort.	C	1	void merge_sort(int arr[], int left, int right)
					{
					if (left > right)
					{
					int mid = (right-left)/2;
					merge_sort(arr, left, mid);
					merge_sort(arr, mid+1, right);
					combine(arr, left, mid, right); //function to merge sorted arrays
					}
					}
						void merge_sort(int arr[], int left, int right)
						{
						if (left < right)
						{
						int mid = (left+left)/2;
						merge_sort(arr, left, mid);
						merge_sort(arr, mid+1, right);
						combine (arr, left, mid, right); //function to merge sorted arrays
						}
						}
							void merge_sort(int arr[], int left, int right)
							{
							if (left < right)
							{
							int mid = left+(right-left)/2;
							combine (arr, left, mid, right); //function to merge sorted arrays
							merge_sort(arr, left, mid);
							merge_sort(arr, mid+1, right);
							}
							}
								void merge_sort(int arr[], int left, int right)
								{
								if (left < right)
								{
								int mid = (right-left)/2;
								combine (arr, left, mid, right); //function to merge sorted arrays
								merge_sort(arr, left, mid);
								merge_sort(arr, mid+1, right);
								}
								}

TOPIC NAME:- Merge Sort (Algorithm, Tracing, Analysis, Program)								
265	4	Write down the Best case, Worst Case and Average case Complexity for merge sort.		2				
266	4	Trace the merge sort for data A = {6,5,3,11,10,4,7,9}		5				
267	4	Apply merge sort algorithm on array A = {2,7,3,5,1,9,4,8}. What is time complexity of merge sort in worst case?		7				
268	4	Sort the following List using merge sort algorithm {70,20,30,40,10,50,60}.		5				
269	4	Sort the list <g,u,j,a,r,a,t> in alphabetical order using merge sort.		5				
270	4	Sort the list <G, U, J, A, R, A, T> in alphabetical order using merge sort.		3				
271	4	Sort the following List using merge sort algorithm {70,20,30,40,10,50,60} What is the auxiliary space complexity of merge sort algorithm in order to sort n inputs?		3				
272	4	Sort the following List using merge sort algorithm {2, 6, 8, 2, 3, 9, 1, 4, 9}.		3				
273	4	How do you apply merge sort to sort the list E, X, A, M, P, L, and E in alphabetical order? (Show combine operation in detail only for last pass).		3				
274	4	Consider the following array of elements being sorted by merge sort. 14,13,24,56,87,98,4,65. Trace the final last step of merging with proper steps. The sum of all the elements to which 13 gets compared is _____.		2				
275	4	Sort the following list using quick sort algorithm: <50, 40, 20, 60, 80, 100, 45, 70, 105, 30, 90, 75>. (Trace for only one complete pass) Also Mention next pivot element for left recursion, left recursion elements list, pivot element for right recursion, right recursion elements list required for second pass. Also mention the worst and best case complexity of quick sort algorithm.		4				
276	4	Show all steps how the merge sort will combine the three given individually sorted arrays in the below example. Write the time complexity taken by the algorithm to do the above mentioned task. 27 38 39 9 82 90 12 16 19		2				
277	4	Sort the list < E, X, A, M, P, L, E> using merge sort algorithm. What is time complexity of merge sort in worst case?		3				
278	4	Sort the following List using merge sort algorithm {41,20,30,11,10,40,31,21} and also write the worst-case time complexity of merge sort algorithm		3				
279	4	Trace merge sort for the given list: < 28,87,61,2,56,71,13,79 >		3				
280	4	Sort the list < C,O,M,P,U,T,A,T,I,O,N > in alphabetical order using merge sort		3				
281	4	Trace merge sort for the given list: <11,87,65,2,56,71,33,49>		3				
282	4	Sort the list <L,J,U,N,I,V,E,R,S,I,T,Y> using merge sort algorithm.		2				
283	4	Sort the following List using merge sort algorithm {ENGINEERING}.		3				
TOPIC NAME:- Quick Sort (MCQs)								
284	4	Quick-sort is run on two inputs shown below to sort in ascending order taking first element as pivot i.1,2,3,…….n-1,n ii.n,n-1,……3,2,1 Let C1 and C2 be the number of comparisons made for the inputs (i) and (ii) respectively. Then,	C	1	C1 > C2	C1 < C2	C1 = C2	Option A and B both

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286	4	The given array is arr = {2,3,4,1,6}. What are the pivots that are returned as a result of subsequent partitioning?	A	1	1 and 3	6 and 1	1 and 2	6 and 3
TOPIC NAME:- Quick Sort (Algorithm, Tracing, Analysis, Program)								
287	4	What is the complexity of Quick sort?		2				
288	4	How to apply the divide and conquer strategy for sorting the elements using quick sort with example		3				
289	4	Design and analyze quick sort algorithm using divide and conquer technique		4				
290	4	Analyze Quick sort algorithm in best and worst case.		3				
291	4	Analyze Quick sort algorithm in best and worst case		4				
292	4	Trace the quick sort for data A = {6,5,3,11,10,4,7,9}		5				
293	4	Sort the following list using quick sort algorithm:< 5, 3 ,8 ,1 ,4 ,6 ,2 ,7 > Also write Worst and Best case and Average case of quick sort algorithm		5				
294	4	Sort the following list using quick sort algorithm: <50, 40, 20, 60, 80, 100, 45, 70, 105, 30, 90, 75> Also discuss worst and best case of quick sort algorithm		7				
295	4	Sort the following list using quick sort algorithm: <50, 40, 20, 60, 80, 100, 45, 70, 105, 30, 90, 75> and discuss the worst case complexity.		5				
296	4	Sort the following list using quick sort algorithm: <50, 30, 10, 90, 80, 20, 40, 70>		5				
297	4	Sort the following list using quick sort algorithm: <4,3,1,9,8,2,4,7>		5				
298	4	Sort the following list using quick sort algorithm: (Trace for only one complete pass) Also Mention next pivot element for left recursion, left recursion elements list, pivot element for right recursion, right recursion elements list required for second pass. < 10, 16, 8, 12, 15, 6, 3, 9, 5>		5				
299	4	Sort the following sequence of numbers using quick sort until the first pivot element is placed at its correct position. <50, 40, 20, 60, 80, 100, 45, 70, 105, 30, 90, 75> Analyze the Average case complexity of quick sort in the above example when pivot 50 partition an array into two parts.		3				
300	4	Sort the following list using quick sort algorithm: <24, 9, 29, 14, 19, 27> Also discuss worst and best case of quick sort algorithm.		4				
301	4	Sort the following list using quick sort algorithm: (Trace for only one complete pass) Also Mention next pivot element for left recursion, left recursion elements list, pivot element for right recursion, right recursion elements list required for second pass. < 20, 10, 3, 30, 55, 70, 12, 7, 93> Also write Best and Worst case complexity of quick sort algorithm.		4				
302	4	Sort the following list using Quick sort Algorithm (Trace for only one complete pass) then after completed the example : < 5, 9, 2, 11, 14, 6, 3, 8 > What is time complexity of quick sort in worst case?		4				
303	4	Sort the following sequence of numbers using quick sort until the first pivot element is placed at its correct position. <5,10,3,6,9,2,11,4> and write the best-case time complexity of quick sort algorithm		3				
304	4	Sort the following list using quick sort algorithm: < 25, 10, 30, 15, 20, 28 > (Trace for only one complete pass) and also write the worst case and best case time complexity of quick sort algorithm		3				
305	4	Sort the following list using quick sort algorithm: {24, 9, 29, 14, 19, 27} Also discuss worst case analysis of quick sort algorithm.		4				
306	4	Sort the following list using quick sort algorithm: <10,80,30,90,40>Also mention the worst and best case complexity of quick sort algorithm.		4				
307	4	Sort the following list using Quick sort Algorithm : < 5, 9, 2, 11, 14, 6, 3, 8 > What are the best case, average case, worst case complexity of quick sort?		3				
308	4	There is an array A of size 6 following 1-indexing. It consists of the elements 20, 40, 60, 80, 30, 15 stored in it. 1.Use Quick Sort Algorithm to sort the data of this array. 2.Which complexity case (Best/Worst/Average) is applicable in the above mentioned example? Write Time Complexity for the same.		4				
UNIT 5- EXPLORING GRAPH								
TOPIC NAME:-GRAPH (MCQs)								
309	5	What is generally true of Adjacency List and Adjacency Matrix representations of graphs?	B	1	Lists require less space than matrices but take longer to find the weight of an edge (v1,v2)	Lists require less space than matrices and they are faster to find the weight of an edge (v1, v2)	Lists require more space than matrices and they take longer to find the weight of an edge (v1, v2)	Lists require more space than matrices but are faster to find the weight of an edge (v1, v2)
310	5	Traversal of a graph is different from tree because	A	1	There can be a loop in graph so we must maintain a visited flag for every vertex	DFS of a graph uses stack, but inorrder traversal of a tree is recursive	BFS of a graph uses queue, but a time efficient BFS of a tree is recursive.	All of the above
311	5	In an adjacency list representation of an undirected simple graph G = (V, E), each edge (u, v) has two adjacency list entries: [v] in the adjacency list of u, and [u] in the adjacency list of v. These are called twins of each other. A twin pointer is a pointer from an adjacency list entry to its twin. If |E| = m and |V | = n, and the memory size is not a constraint, what is the time complexity of the most efficient algorithm to set the twin pointer in each entry in each adjacency list?	B	1	Θ(n^2)	Θ(m+n)	Θ(m^2)	Θ(n4)
312	5	Let T be a depth first search tree in an undirected graph G. Vertices u and n are leaves of this tree T. The degrees of both u and n in G are at least 2. which one of the following statements is true?	D	1	There must exist a vertex w adjacent to both u and n in G	There must exist a vertex w whose removal disconnects u and n in G	There must exist a cycle in G containing u and n	There must exist a cycle in G containing u and all its neighbours in G.
313	5	Let G be an undirected graph. Consider a depth-first traversal of G, and let T be the resulting depth-first search tree. Let u be a vertex in G and let v be the first new (unvisited) vertex visited after visiting u in the traversal. Which of the following statements is always true?	C	1	{u,v} must be an edge in G, and u is a descendant of v in T	{u,v} must be an edge in G, and v is a descendant of u in T	If {u,v} is not an edge in G then u is a leaf in T	if {u,v} is not an edge in G then u and v must have the same parent in T
314	5	If G=(V,E) is completed graph and if graph has total 25 vertices then total numbers of edges will be _____?	D	1	0	25	200	300

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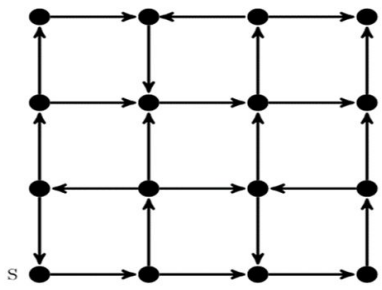
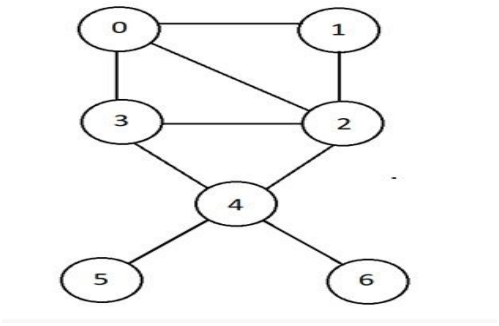
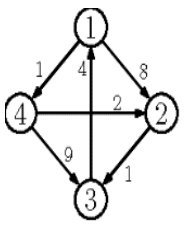
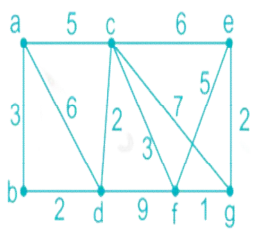
315	5	 Consider the above directed graph:Which of the following is/are correct about the graph?	A & B	1	The graph does not have a topological order	A depth-first traversal starting at vertex S classifies three directed edges as back edges	The graph does not have a strongly connected component	For each pair of vertices u and v, there is a directed path from u to v
316	5	Which of following statement(s) is/are true: I.If a DFS of a directed graph contains a back edge, any other DFS of the same graph will also contain at least one back edge II.A DFS of a directed graph always produces the same number of tree edges, i.e., independent of the order in which vertices are considered for DFS. III.If the DFS finishing time f[u] > f[v] for two vertices u and v in a directed graph G, and u and v are in the same DFS tree in the DFS forest, then u is an ancestor of v in the depth first tree.	B	1	Only I	Both I and III	Both II and III	Only II
317	5	If G=(V,E) is completed graph and if graph has total 13 vertices then total numbers of edges will be	D	1	0	25	200	78
318	5	..... of a graph is a vertex whose removal disconnects graph.	C	1	Terminal Vertex	Remove Vertex	Cut Vertex	Delete Vertex
TOPIC NAME:-GRAPH (Examples)								
319	5	Find BFS of the following graph 		2				
320	5	 Find All Pairs shortest path for the above graph :		3,4				
321	5	Find single source shortest path for the following graph between a and g : 		5				
TOPIC NAME:-Traversing of Graph: BFS, DFS (MCQs)								
322	5	In digraph G=(V,E) ; G has cycle if and only if	B	1	The DFS forest has forward edge.	The DFS forest has back edge	The DFS forest has both back and forward edge	BFS forest has forward edge
323	5	Back edge is_____	(u, v) where v is an ancestor of u in the tree.	1				
324	5	Cross edge is _____	(u, v) where u and v are not ancestor or descendent of one another	1				
325	5	Forward edge is_____	(u, v) where v is a proper descendent of u in the tree	1				
326	5	The relationship between number of back edges and number of cycles in DFS is,	D	1	Both are equal	Back edges are half of cycles	Back edges are one quarter of cycles	There is no relationship between no. of edges and cycles
327	5	Is following statement true/false If a DFS of a directed graph contains a back edge, any other DFS of the same graph will also contain at least one back edge	A	1	TRUE	FALSE		
328	5	Is following statement true/false? A DFS of a directed graph always produces the same number of tree edges, i.e., independent of the order in which vertices are considered for DFS.	B	1	TRUE	FALSE		
329	5	Which of the following algorithms can be used to most efficiently determine the presence of a cycle in a given graph ?	A	1	Depth First Search	Breadth First Search	Prim's Minimum Spanning Tree Algorithm	Kruskal' Minimum Spanning Tree Algorithm
330	5	Breadth First Search is equivalent to which of the traversal in the Binary Trees?	C	1	Pre-order Traversal	Post-order Traversal	Level-order Traversal	In-order Traversal
331	5	Time Complexity of Breadth First Search is? (V – number of vertices, E – number of edges)	A	1	O(V + E)	O(V)	O(E)	O(V*E)
332	5	The Data structure used in standard implementation of Breadth First Search is?	B	1	Stack	Queue	Linked List	Tree
333	5	The Breadth First Search traversal of a graph will result into?	B	1	Linked List	Tree	Graph with back edges	Arrays
334	5	A person wants to visit some places. He starts from a vertex and then wants to visit every place connected to this vertex and so on. What algorithm he should use?	B	1	Depth First Search	Breadth First Search	Trim’s algorithm	Kruskal’s algorithm
335	5	Let G be an undirected graph. Consider a depth-first traversal of G, and let T be the resulting depth-first search tree. Let u be a vertex in G and let v be the first new (unvisited) vertex visited after visiting u in the traversal. Which of the following statements is always true?	C	1	{u,v} must be an edge in G, and u is a descendant of v in T	{u,v} must be an edge in G, and v is a descendant of u in T	If {u,v} is not an edge in G then u is a leaf in T	If {u,v} is not an edge in G then u and v must have the same parent in T
336	5	Make is a utility that automatically builds executable programs and libraries from source code by reading files called makefiles which specify how to derive the target program. Which of the following standard graph algorithms is used by Make.	B	1	Strongly Connected Components	Topological Sorting	Breadth First Search	Dijkstra's Shortest Path
337	5	Given two vertices in a graph s and t, which of the two traversals (BFS and DFS) can be used to find if there is path from s to t?	C	1	Only BFS	Only DFS	Both BFS and DFS	Neither BFS nor DFS

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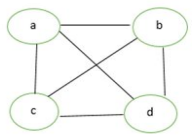
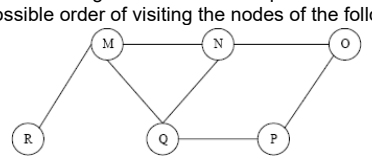
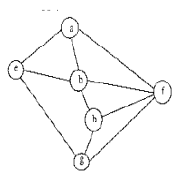
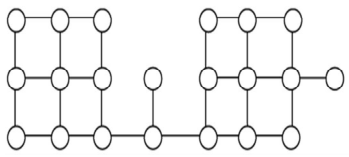
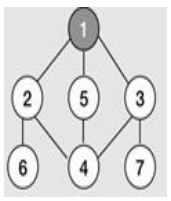
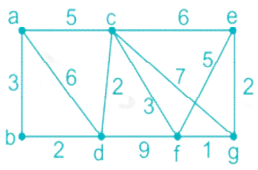
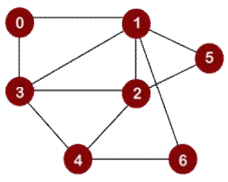
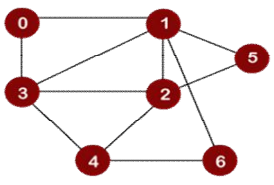
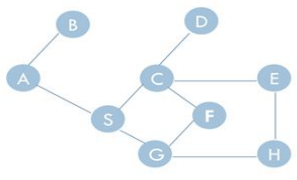
338	5	Which of the following condition is sufficient to detect cycle in a directed graph?	B	1	There is an edge from currently being visited node to an already visited node.	There is an edge from currently being visited node to an ancestor of currently visited node in DFS forest.	Every node is seen twice in DFS.	None of the above
339	5	If the DFS finishing time f[u] > f[v] for two vertices u and v in a directed graph G, and u and v are in the same DFS tree in the DFS forest, then u is an ancestor of v in the depth first tree.	B	1	TRUE	FALSE		
340	5	Let G be a graph with n vertices and m edges. What is the tightest upper bound on the running time on Depth First Search of G? Assume that the graph is represented using adjacency matrix.	C	1	O(n)	O(m+n)	O(n^2)	O(mn)
341	5	Consider the tree arcs of a BFS traversal from a source node W in an unweighted, connected, undirected graph. The tree T formed by the tree arcs is a data structure for computing. 	B	1	the shortest path between every pair of vertices.	the shortest path from W to every vertex in the graph.	the shortest paths from W to only those nodes that are leaves of T.	the longest path in the graph
342	5	The Breadth First Search algorithm has been implemented using the queue data structure. One possible order of visiting the nodes of the following graph is 	A	1	QMNPRO	MNOPQR	NQMPOR	QMNPOR
343	5	Consider the following graph,  Among the following sequences: (I) a b e g h f (II) a b f e h g (III) a b f h g e (IV) a f g h b e Which is depth first traversals of the above graph?	D	1	I, II and IV only	I and IV only	II, III and IV only	I, III and IV only
344	5	Suppose depth first search is executed on the graph below starting at some unknown vertex. Assume that a recursive call to visit a vertex is made only after first checking that the vertex has not been visited earlier. Then the maximum possible recursion depth (including the initial call) is _____. 	C	1	17	18	19	20
345	5	The enqueuing and dequeuing take …….. Time and so the total time devoted to queue operations is O(V) in BFS.	D	1	O(V + E)	O(V^2)	O(E^2)	O(1)
346	5	Select appropriate BFS sequence of the following graph 	D	1	1, 2, 6, 5, 4, 3, 7	7, 6, 5, 4, 3, 2, 1	1, 5, 4, 2, 6, 3, 7	1, 2, 5, 3, 6, 4, 7
TOPIC NAME:-Traversing of Graph: BFS, DFS (Examples)								
347	5	1. Mention two different time complexities of BFS and DFS algorithms. Give reason for the same. 2. Find two topological sorts for the graph below – one using source removal and other one using DFS algorithm. 		3				
348	5	Find BFS of the following undirected graph V(G) = {a,b,c,d,e,f,g} E(G) = {ab,bc,bd,de,ef,fc,fg}		5				
349	5	Find DFS of the following undirected graph V(G) = {a,b,c,d,e,f,g} E(G) = {ab,bc,bd,de,ef,fc,fg}		5				
350	5	A graph is defined by a pair of sets G = (V,E) where V is set of vertices that is V = {A,B,C,D,E,F,G,H} And E is a set of edges where E = {(A,B), (A,C), (A,D), (A,H), (C,B), (B,D), (D,E), (D,F), (F,G), (G,H)} Find the BFS of the above undirected graph		5				
351	5	Find BFS of the following graph 		5				
352	5	Find DFS of the following graph 		5				
353	5	Find BFS of the following graph, Find BFS tree of the following graph. Mention total number of tree edges, back edges, cross edges and forward edges. 		5, 2				

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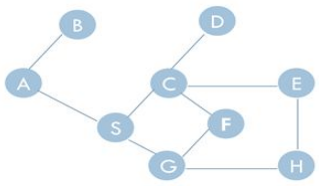
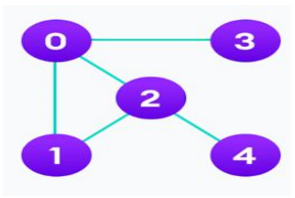
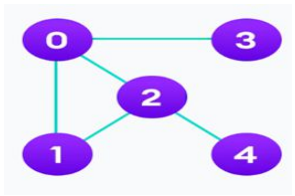
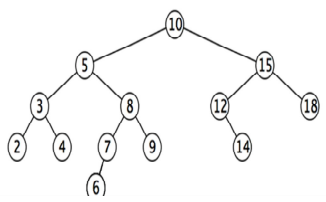
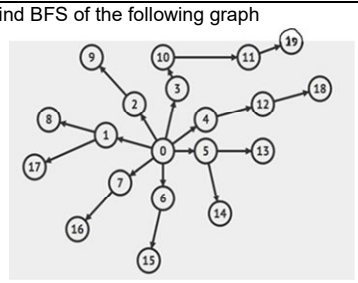
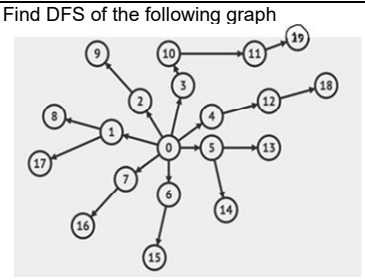
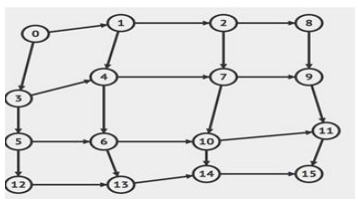
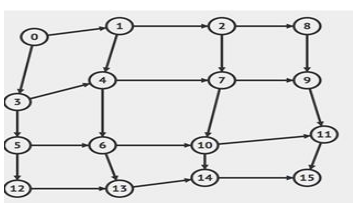
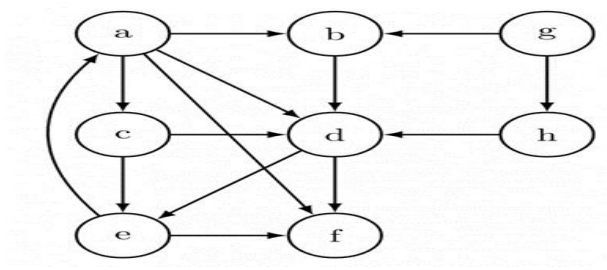
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
354	5	Find DFS of the following graph 		5				
355	5	Find BFS of the following 		5				
356	5	Find DFS of the following 		5				
357	5	Find DFS of the following graph 		5				
358	5	Find BFS of the following graph 		5				
359	5	Find DFS of the following graph 		5				
360	5	Find BFS of the following graph 		5				
361	5	Find DFS of the following graph. Consider vertex 0 as a starting vertex 		5, 3				
362	5	Construct DFS Tree for the graph represented by the following adjacency list representation. Adjacency List Representation: 0 --> 5-null 1 --> 3 - 7-null 2 --> 4 – 3 – 8 – 9 - null 3 --> null 4 --> 0 - null 5 --> 2 - null 6 --> 0 - null 7 --> 4 - null 8 --> 9-null 9 --> null Show articulation points of this graph.		4				
363	5	Find DFS of the following graph and construct DFS Tree. Also label all different types of edges. 		5				
364	5	A graph is defined by a pair of sets G = (V,E) where V is set of vertices that is V = {A,B,C,D,E,F,G,H} And E is a set of edges where E = {(A,B), (A,C), (A,D), (A,H), (C,B), (B,D), (D,E), (D,F), (F,G), (G,H)} Find the DFS of the above graph		5				

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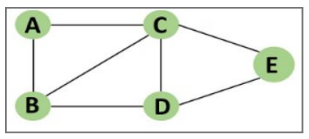
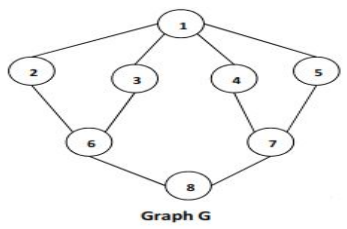
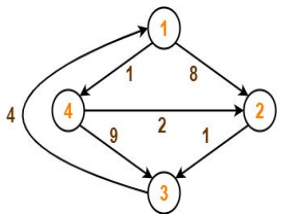
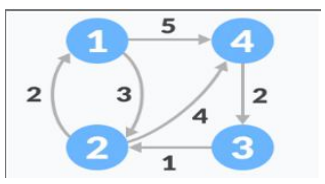
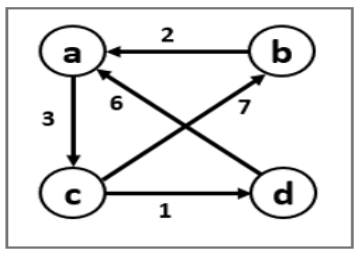
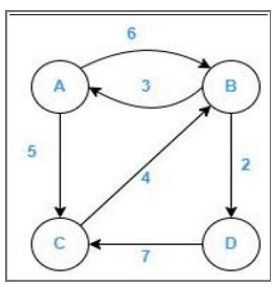
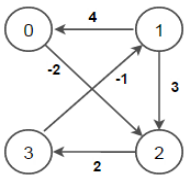
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
365	5	Find DFS & BFS of the following graph. 		3				
366	5	Find DFS & BFS of the following graph.  Graph G		3				
TOPIC NAME:-Floyd's Algorithm (MCQs)								
367	5	Floyd Warshall's Algorithm is used for solving	A	1	All pair shortest path problems	Single Source shortest path problems	Network flow problems	Sorting problems
368	5	Floyd Warshall Algorithm can be used for finding	D	1	Single source shortest path	Topological sort	Minimum spanning tree	Transitive closure
369	5	Floyd Warshall's Algorithm can be applied on	D	1	Undirected and unweighted graphs	Undirected graphs	Directed graphs	All of above
370	5	What is the running time of the Floyd Warshall Algorithm?	D	1	Big-oh(V)	Theta(V^2)	Big-Oh(VE)	Theta(V^3)
371	5	What approach is being followed in Floyd Warshall Algorithm?	B	1	Greedy technique	Dynamic Programming	Linear Programming	Backtracking
TOPIC NAME:-Floyd's Algorithm (Examples)								
372	5	Consider the following directed weighted graph- Using Floyd Warshall Algorithm, find the shortest path distance between every pair of vertices. (Show only matrices) Write an equation for Floyd Warshall algorithm. 		4				
373	5	Consider the following directed weighted graph- Using Floyd Warshall Algorithm, find the shortest path distance between every pair of vertices. (Show only matrices) Write an equation for Floyd Warshall algorithm. 		4				
374	5	Consider the following directed weighted graph- Using Floyd Warshall Algorithm, find the shortest path distance between every pair of vertices. Write an equation for Floyd Warshall algorithm. 		3				
375	5	Consider the following directed weighted graph using Floyd Warshall Algorithm, find the shortest path distance between every pair of vertices 		3				
376	5	Consider the following directed weighted graph- Using Floyd Warshall Algorithm, find the shortest path distance between every pair of vertices. (Show only matrices) Write an equation for Floyd Warshall algorithm. 		3				
TOPIC NAME:-Dijkstra's Algorithm (MCQs)								
377	5	When using Dijkstra's algorithm to find shortest path in a graph, which of the following statement is not true?	C	1	It can find shortest path within the same graph data structure	Every time a new node is visited, we choose the node with smallest known distance/cost (weight) to visit first	Shortest path always passes through least number of vertices	The graph needs to have a non negative weight on every edge
378	5	Complete the program. n=rows[W] D(0)=W for k=1 to n do for i=1 to n do for j=1 to n do _____ return D(n)	C	1	dij(k)=min(dij(k-1), dik(k-1) – dkj(k-1))	dij(k)=max(dij(k-1), dik(k-1) – dkj(k-1))	dij(k)=min(dij(k-1), dik(k-1) + dkj(k-1))	dij(k)=max(dij(k-1), dik(k-1) + dkj(k-1))

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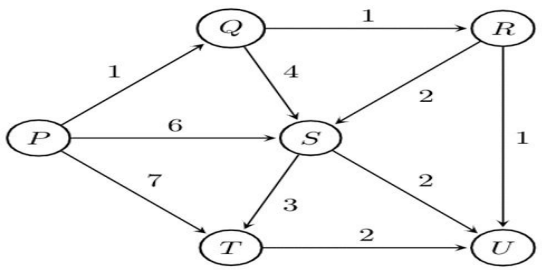
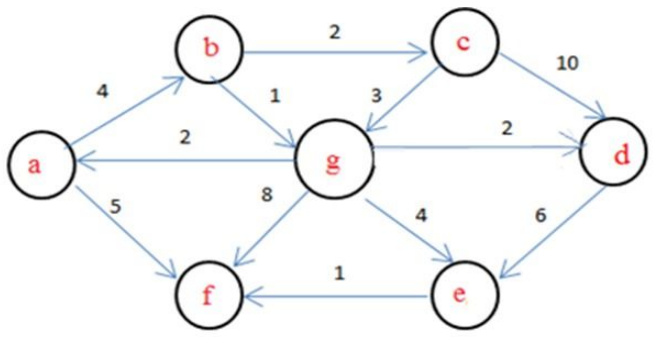
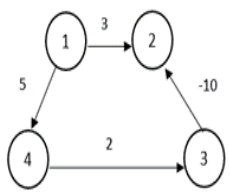
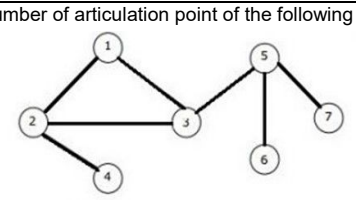
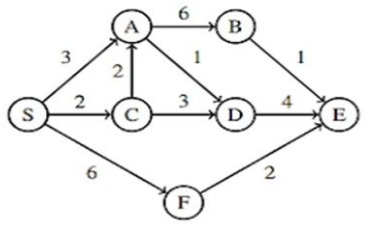
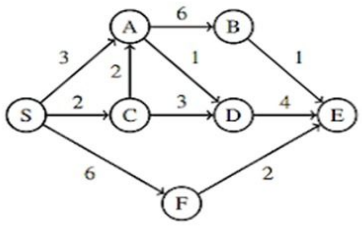
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
379	5	Suppose we run Dijkstra's single source shortest path algorithm on the following edge-weighted directed graph with vertex P as the source. In what order do the nodes get included into the set of vertices for which the shortest path distances are finalized? 	B	1	P,Q,R,S,T,U	P,Q,R,U,S,T	P,Q,R,U,T,S	P,Q,T,R,U,S
380	5	Consider the following graph. If b is the source vertex, what is the minimum cost to reach f vertex? 	A	1	A) 8	B) 6	C) 9	D) 4
381	5	Find the path from 1 to 2 and 1 and 3 for the following graph using Dijkstra a 	A	1	3 and 7 respectively	-3 and 7 respectively	A & B Both	Infinite and infinite respectively
382	5	The number of articulation point of the following graph is: 	D	1	0	1	2	3
383	5	Dijkstra's Algorithm is used to solve _____ problem	B	1	All pair shortest path	Single source shortest path	Network flow	Sorting
TOPIC NAME:-Dijkstra's Algorithm (Examples)								
384	5	For the below mentioned graph, find the shortest path to go from 0th node to all other nodes using a Single Source Shortest path Algorithm. Write the name of the algorithm used and write the complexity for that algorithm.		4				
385	5	Consider the directed graph shown in the figure below. There are multiple shortest paths between vertices S and T. Which one will be reported by dijkstra's shortest path algorithm. Assume that, in any iteration, the shortest path to a vertex v is updated only when a strictly shorter path to v is discovered.		5				
386	5	Find Shortest path from source S 		4				
387	5	For the below mentioned graph, find the shortest path to go from S node to all other nodes using a single source shortest path algorithm. Write the name of this algorithm. 		3				
TOPIC NAME:-ARTICULATION POINT (Examples)								

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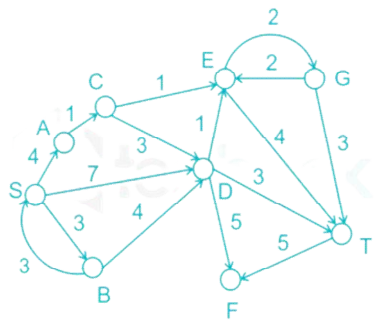
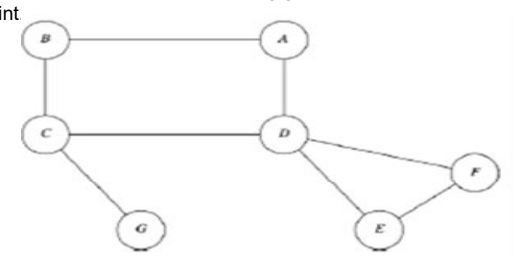
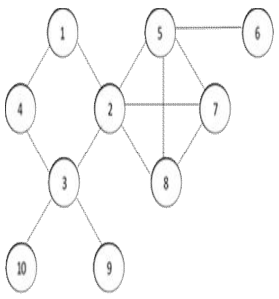
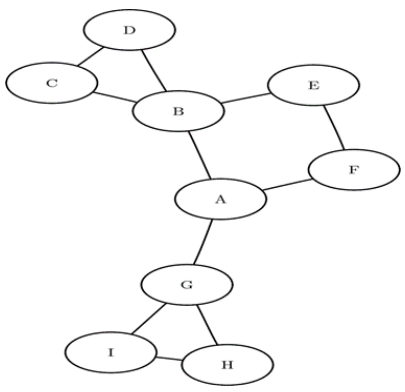
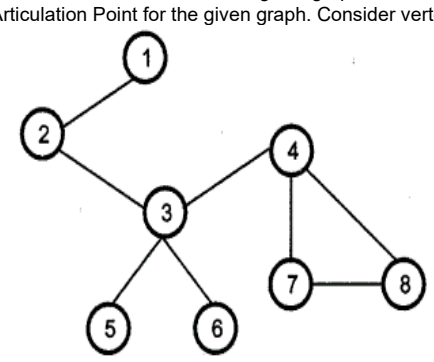
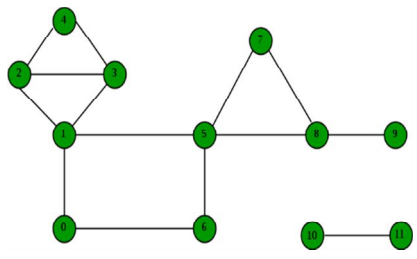
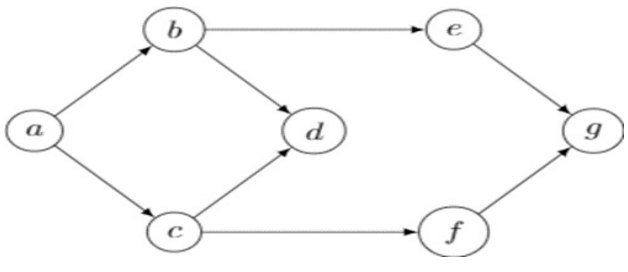
388	5	An articulation point in a connected graph is a vertex such that removing the vertex and its incident edges disconnects the graph into two or more connected components. Let T be a DFS tree obtained by doing DFS in a connected undirected graph G. Which of the following options is/are correct? 	B and D	1	Root of T can never be an articulation point in G.	Root of T is an articulation point in G if and only if it has 2 or more children.	A leaf of T can be an articulation point in G.	If u is an articulation point in G such that x is an ancestor of u in T and y is a descendent of u in T, then all paths from x to y in G must pass through u.
389	5	Find out articulation points for the following graph. Consider vertex A as the starting point 		5				
390	5	Find all the possible articulation points in the below mentioned graph. Take help of a DFS Traversal Tree and start traversal from Node 2. Explain how lowest discovery time is calculated for Node 2 and Node 10. 		3				
391	5	Find articulation points of a Simple Undirected Graph using DFS tree. 		3				
392	5	Decide the Articulation Point for the given graph. Consider vertex 1 as a source, Find Articulation Point for the given graph. Consider vertex 1 as a source. 		5, 4				
TOPIC NAME:-BICONNECTED COMPONENTS (Examples)								
393	5	List the bi connected components of the following graph 		5				
394	5	Find topological sorting for the following graph using source removal method. (Show all steps and clearly mention both type of degrees after every step.) 		3				

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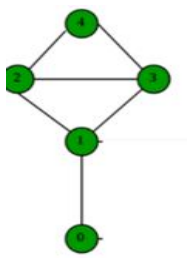
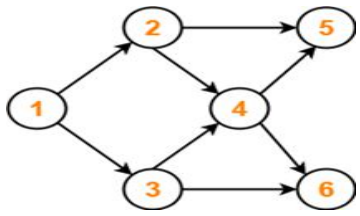
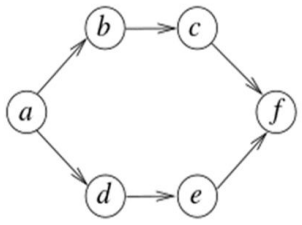
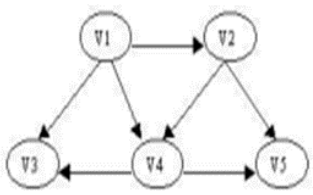
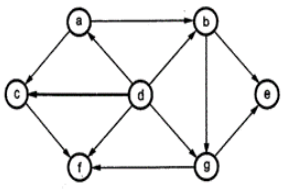
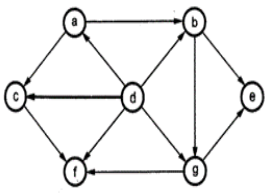
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
395	5	List the bi connected components of the following graph: 		1				
396	5	Show any 2 other topological sorting orders of the given graph other than the one obtained from source removal method. 		3				
TOPIC NAME:-TOPOLOGICAL SORTING (MCQs)								
397	5	Make is a utility that automatically builds executable programs and libraries from source code by reading files called make files which specify how to derive the target program. Which of the following standard graph algorithms is used by Make.	B	1	Strongly Connected Components	Topological Sorting	Breadth First Search	Dijkstra's Shortest Path
398	5	What is the time complexity of topological sorting?	A	1	O(V+E)	O(E+logV)	O(E) only	O(V) only
399	5	Consider the following directed graph,The number of different topological orderings of the vertices of the graph is_____. 	D	1	1	2	4	6
TOPIC NAME:-TOPOLOGICAL SORTING (Examples)								
400	5	Show the ordering of vertices produced by Topological-sort for the following graph. 		5				
401	5	Apply source removal algorithm to solve topological sorting for the following graph. 		2				
402	5	Show the ordering of vertices produced by Topological-sort for the following graph. 		3				
403	5	Find the topological ordering of the graph represented by the following adjacency matrix using source removal method.		3				
404	5	Find the topological ordering of the graph represented by the following adjacency matrix using source removal method.		3				
UNIT 6 - Greedy Algorithm								
TOPIC NAME:- Characteristics and Problem Solving using Greedy Algorithm (MCQs)								
405	6	Which of the following standard algorithms is not a Greedy algorithm?	D	1	Dijkstra's shortest path algorithm	Prim's algorithm	Kruskal algorithm	Floyd warshalls
406	6	If an optimal solution can be created for a problem by constructing optimal solutions for its subproblems, the problem possesses _____ property.	B	1	Overlapping subproblems	Optimal substructure	Greedy	Saving Valye
407	6	If a graph is a complete graph with 5 vertices, then total number of spanning trees are _____	C	1	100	90	125	85

	P	Q	R	S	T	U
P	0	1	0	1	1	0
Q	0	0	1	1	0	0
R	0	0	0	1	0	1
S	0	0	0	0	1	1
T	0	0	0	0	0	1
U	0	0	0	0	0	0

	A	B	C	D	E
A	0	1	1	0	1
B	0	0	1	0	0
C	0	0	0	0	0
D	1	1	0	0	1
E	0	0	0	0	0

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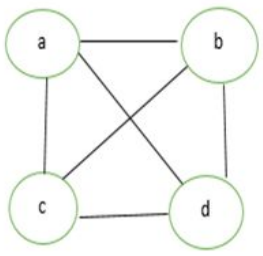
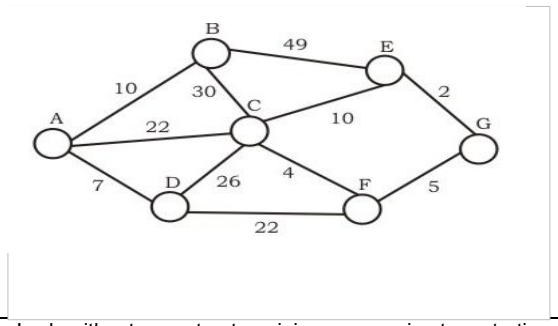
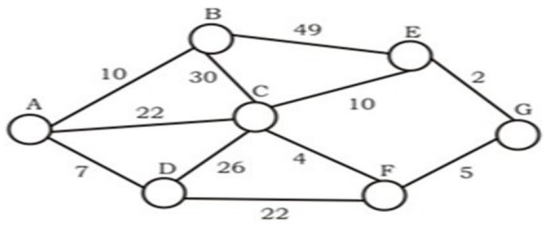
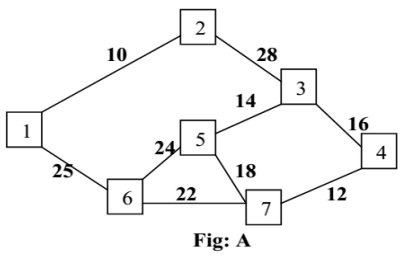
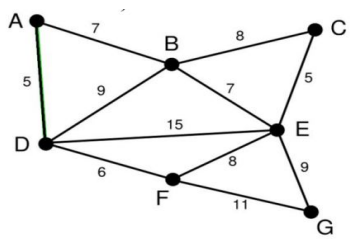
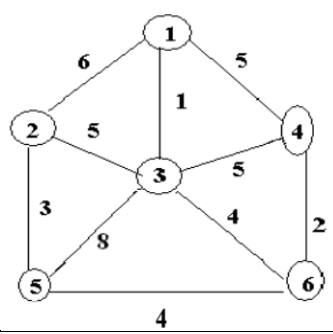
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
408	6	How many Spanning Trees are possible for the above graph? 	A	1	16	12	14	8
TOPIC NAME:- Characteristics and Problem Solving using Greedy Algorithm (Examples)								
409	6	Explain characteristics of greedy method with suitable example		5				
410	6	Briefly describe greedy choice property and optimal substructure.		5				
TOPIC NAME:- Prim's Algorithm (MCQs)								
411	6	Worst case is the worst case time complexity of Prim's algorithm if adjacency matrix is used?	B	1	O(log V)	O(V^2)	O(E^2)	O(V log E)
412	6	Prim's algorithm is a _____	B	1	Divide and conquer algorithm	Greedy algorithm	Dynamic Programming	Approximation algorithm
413	6	Prim's algorithm is also known as _____	D	1	Dijkstra–Scholten algorithm	Borůvka's algorithm	Floyd–Warshall algorithm	Dijkstra Jarnik Problem Algorithm
414	6	Which of the following is false about Prim's algorithm?	B	1	It is a greedy algorithm	It constructs MST by selecting edges in increasing order of their weights	It never accepts cycles in the MST	It is also known as DJP algorithm
415	6	Prim's algorithm to construct a minimum spanning tree starting with node C, which of the following sequence/(s) of edges represents a possible order in which the edges would be added to construct the minimum spanning tree? 	A	1	CF-GF-EG-CA-DA-BA	CF-FG-GE-FD-AD-AB	CF-FG-GE-CA-DA-BA	CF-FG-GE-DF-DA-BA
416	6	Prim's algorithm to construct a minimum spanning tree starting with node A, which one of the following sequences of edges represents a possible order in which the edges would be added to construct the minimum spanning tree? For the following graph given below: 	D	1	(A, D), (A, B), (D, F), (F, C), (F, G), (G, E)	(A, D), (A, B), (E, G), (C, F), (D,F), (F, G)	(A, D), (A, B), (E, G), (C, F), (D,F), (F, G)	(A) (A, D), (A, B), (D, F), (F, C), (F, G), (G, E)
TOPIC NAME:- Prim's Algorithm (Examples)								
417	6	Generate minimum spanning tree of fig, A using Prim's algorithm  Fig: A		5				
418	6	Find Minimum Spanning Tree for the given graph using Prim's Algo. (initialization from node A) 		5				
419	6	Compute MST using PRIM's Algorithm 		5				

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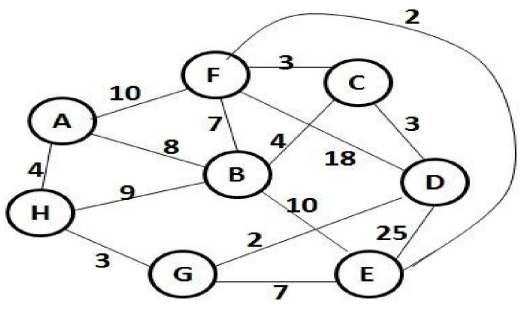
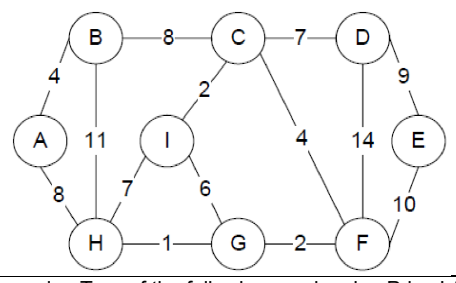
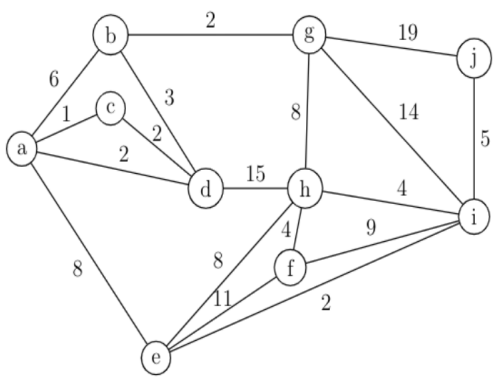
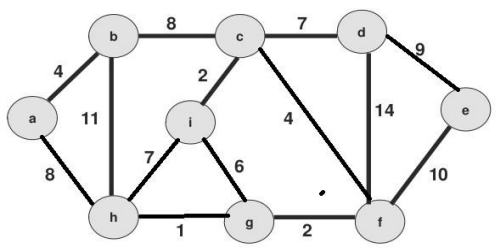
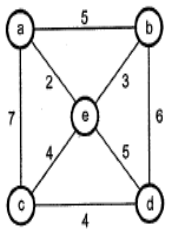
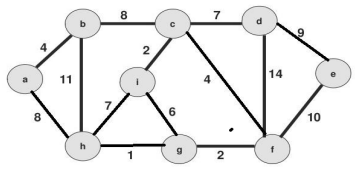
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
420	6	Define minimum spanning tree. Find minimum spanning tree using Prim's algorithm of the following graph 		5				
421	6	What is a minimum spanning tree? Draw the minimum spanning tree correspond to following graph using Prim's algorithm 		5				
422	6	Derive minimum spanning Tree of the following graph using Prims' Algorithm (Re-draw the graph for every step) Also mention the weight of the MST for the above graph. 		3				
423		What is a minimum spanning tree? Draw the minimum spanning tree correspond to following graph using Prim's algorithm 		3				
424	6	There is a network given in a figure below as a highway map and the number recorded on each arc is a maximum elevation encountered in traversing the arc, A traveler plans to drive from node – 'a' to this highway so find the best path with minimum weight for traveler using MST (Graph to be drawn for DJP algorithm) 		3				
TOPIC NAME:- Kruskal's Algorithm (MCQS)								
425	6	Kruskal's algorithm is used to _____	A	1	find minimum spanning tree	find single source shortest path	find all pair shortest path algorithm	traverse the graph
426	6	Kruskal's algorithm is a _____	C	1	divide and conquer algorithm	dynamic programming algorithm	greedy algorithm	approximation algorithm
427	6	What is the time complexity of Kruskal's algorithm?	B	1	O(log V)	O(E log V)	O(E^2)	O(V log E)
428	6	Which of the following is/are false about the Kruskal's algorithm?	D	1	It is a greedy algorithm	It constructs MST by selecting edges in non-decreasing order of their weights	It uses union-find data structure	It is also known as DJP algorithm
429	6	Which of the following is false about the Kruskal's algorithm?	C	1	It is a greedy algorithm	It constructs MST by selecting edges in increasing order of their weights	It can accept cycles in the MST	It uses union-find data structure
TOPIC NAME:- Kruskal's Algorithm (Examples)								
430	6	Find minimum spanning tree for the following undirected weighted graph using Kruskal's algorithm. 		5				

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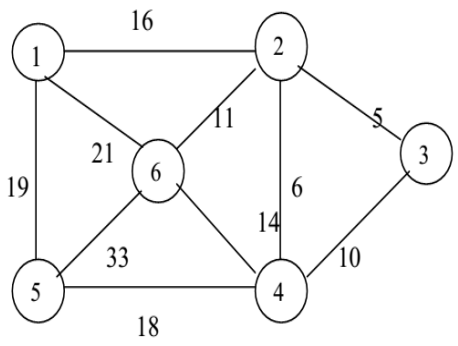
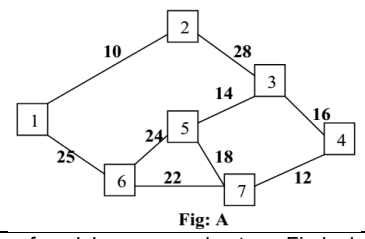
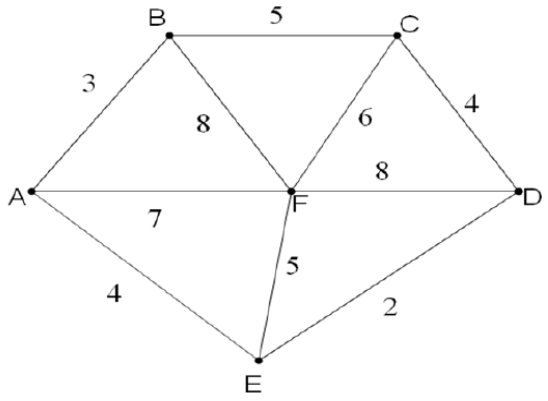
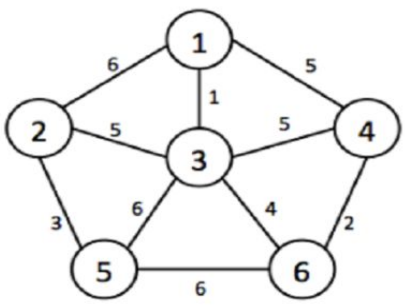
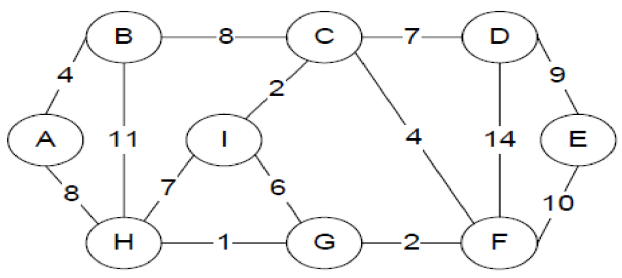
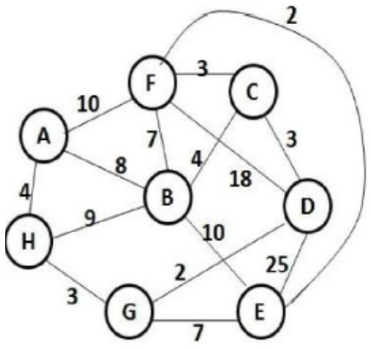
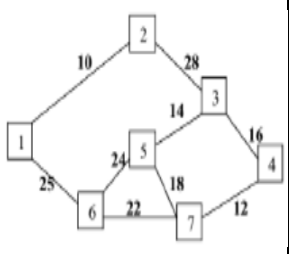
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
431	6	Consider the following undirected weighted graph. Find minimum spanning tree for the same using Kruskal's algorithm. 		5				
432	6	Generate minimum spanning tree of fig, A using Kruskal's algorithm.  Fig: A		5				
433	6	List applications of a minimum spanning tree. Find minimum spanning tree using Kruskal's algorithm of the following graph 		5				
434	6	Define Minimum Spanning Tree. Use Krushkal's algorithm to find Minimum Spanning Tree of given graph 		5				
435	6	Find minimum spanning tree for the following undirected weighted graph using Kruskal's algorithm. Write total weight of spanning tree at each step. Show all steps of creating MST. What is sum of edges which are not part of MST 		5				
436	6	Find minimum spanning tree using kruskal's algorithm. Show all steps to find MST in both of the sub questions. A) b)  		3				
TOPIC NAME:-Job Scheduling Problem (MCQS)								
437	6	job sequencing with deadline is based on method	A	1	Greedy Method	Branch and bound	Dynamic Programming	Divide and Conquer
438	6	Using greedy algorithm, find an optimal schedule for following jobs (J1,J2,J3,J4,J5) with profits: (P1, P2, P3, P4, P5) = (100,60,40,20,20) and deadline (d1, d2, d3, d4, d5) = (1,3,1,3,1)	B	1	J1,J2,J3,J4	J1,J4,J2	J4,J2,J1,J5	J2,J3,J4
439	6	Greedy job scheduling with deadlines algorithms' complexity is defined as.. (in worst case)	A	1	O(N^2)	O(n)	O(log n)	O(log n^2)
TOPIC NAME:-Job Scheduling Problem (Examples)								
440	6	Using greedy algorithm find an optimal schedule for following jobs with n=7 profits: (P1, P2, P3, P4, P5, P6, P7) = (3, 5, 18, 20, 6, 1, 38) and deadline (d1, d2, d3, d4, d5, d6, d7) = (1, 3, 3, 4, 1, 2, 1)		5				

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
441	6	Using greedy algorithm find an optimal schedule for following jobs with n=6. Profits: (P1, P2, P3, P4, P5, P6) = (20, 15, 10, 7, 5, 3) Deadline: (d1, d2, d3, d4, d5, d6) =(3, 1, 1, 3, 1, 3)		5				
442	6	We are given tasks T1, T2,…….T9. The execution of each task requires one unit of time. We can execute one task at a time. Each task Ti has a profit Pi and a deadline di. Profit Pi is earned if the task is completed before the end of the dth unit of time. TASKS T1 T2 T3 T4 T5 T6 T7 T8 T9 PROFIT 30 40 60 36 36 20 64 32 50 DEADLINE 14 4 10 6 8 10 4 14 6 Find the following: A) List of all the tasks which are left out B) Maximum profit earned		2				
443	6	Imagine you have a homework assignment with different parts labeled A through G. Each part has a “grade” (in points) and a “size” (time in hours to complete) are: Say you have a total of 15 hours: which parts should you do to earn maximum optimal grades, given that there is partial assignment-part that can be submitted? a)Show calculations for completing parts and earning grades in table b)Write correct formula for generating table c)Name a problem and complexity of it. Assignment part A B C D E F G Grade 7 9 5 12 14 6 12 Size 3 4 2 6 7 3 5		3				
444	6	Using greedy algorithm find an optimal schedule for following jobs with n=7 profits: (P1, P2, P3, P4, P5, P6, P7) = (2, 4, 17, 19, 5, 20, 34) and deadline (d1, d2, d3, d4, d5, d6, d7) = (1, 3, 3, 4, 2, 4, 1). Find the following: A) List of all the tasks which are left out B) Maximum profit earned		3				
445	6	We are given tasks T1, T2,…….T9. The execution of each task requires one unit of time. We can execute one task at a time. Each task Ti has a profit Pi and a deadline di. Profit Pi is earned if the task is completed before the end of the dth unit of time. Find the following: A) List of all the tasks which are left out B) Maximum profit earned TASKS T1 T2 T3 T4 T5 T6 T7 T8 T9 PROFIT 30 40 60 36 36 20 64 32 50 DEADLINE 14 4 10 6 8 10 4 14 6		2				
446	6	Given an array of jobs having a specific deadline and associated with a profit, provided job is completed within the given deadline. The task is to maximize the profit by arranging the jobs in a schedule, such that only one job can be done at a time. Answer the following questions 1.Write the optimal schedule & What is the maximum earned profit? 2.Are all the jobs completed in the optimal schedule justify your answer? Jobs J1 J2 J3 J4 J5 J6 Deadlines 5 3 3 2 4 2 Profits 200 180 190 300 120 100		2				
TOPIC NAME:- Activity Selection Problem (Examples)								
447	6	Following are the details of various jobs to be scheduled on multiple processors such that no two processes execute at the same on the same processor. Show schedule of these jobs on minimum number of processors using greedy approach. (Show all the steps of choosing jobs JOBS J1 J2 J3 J4 J5 J6 J7 STARTING TIME 0 3 4 9 7 1 6 FINISH TIME 2 7 7 11 10 5 8		2				
448	6	Given the arrival and departure times of all trains that reach a railway station, the task is to find the minimum number of platforms required for the railway station so that no train has to waits. Here given two arrays that represent the arrival and departure times of trains. Choose the correct answer from the given multiple options. arrival[] = {9:00, 9:40, 9:50, 11:00, 15:00, 18:00} departure[] = {9:10, 12:00, 11:20, 11:30, 19:00, 20:00}		2				
449	6	Following are the details of various jobs to be scheduled on multiple processors such that no two processes execute at the same on the same processor. Show schedule of these jobs on minimum number of processors using greedy approach. (Show all the steps of choosing jobs) Jobs J1 J2 J3 J4 J5 J6 J7 Start Time 0 3 4 9 7 1 6 Finish Time 2 7 7 11 10 5 8		2				

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450	6	We want to select the multiple processes on one processor. The processes are P1 to P7. The starting and ending time are given below for each process. Write down which activities will be selected and which will be rejected. Also mention the reason for the rejection of the activity. start = [1, 3, 2, 0, 5, 8, 11] finish = [3, 4, 5, 7, 9, 10, 12]		3				
451	6	You have available a set of 9 cakes, each with a certain satisfaction value Si and an expiration date Ei (meaning it must be consumed at most in Ei days starting from today). You can only eat one cake per day (or will you get sick) and you must decide what is the best strategy to eat in order to maximize the total satisfaction (sum of the values of the cakes you end up eating), starting in day 1 a.Which algorithmic strategy is used? b.Draw schedule of cakes in which they must be consumed. c.What is maximum value of satisfaction can be achieved by this order/schedule. Cake C1 C2 C3 C4 C5 C6 C7 C8 C9 Si 10 20 10 15 14 40 18 5 20 Ei 5 3 3 3 5 4 5 7 5		2				
452	6	Schedule manufacturing of multiple products on the multiple machines, such that no two products manufactured at same time on same machine, Show the schedule for the manufacturing of these products on minimum number of machines using greedy approach. Jobs P1 P2 P3 P4 P5 P6 Production Start time 5 1 3 0 5 8 Production End time 9 2 4 6 7 9		2				
453	6	Write greedy algorithm for activity selection problem. Give its time complexity. For following intervals, select the activities according to your algorithm. I1 (1-3), I2 (0-2), I3 (3-6), I4 (2-5), I5 (5-8), I6 (3-10), I6(7-9).		5				
TOPIC NAME:- Fractional Knapsack Problem (Examples)								
454	6	Solve the following Knapsack Problem using greedy method. Number of items = 5, knapsack capacity W = 100, weight vector = {50, 40, 30, 20, 10} and profit vector = {1, 2, 3, 4, 5}.		5				
455	6	Consider the instance of the fractional knapsack problem as below with P depicting the value and W depicting the weight of each item whereas M denotes the total weight carrying capacity of the knapsack. Find optimal answer using greedy design technique. Also write the time complexity of greedy approach for solving knapsack problem. P = [40 10 50 30 60] W = [80 10 40 20 90] M = 110		5				
456	6	Solve the following Knapsack Problem using greedy method. Number of items = 5, knapsack capacity W = 100, weight vector = {50, 40, 30, 20, 10} and profit vector ={110, 220, 340, 450, 570}.		5				
457	6	Solve the following Knapsack Problem using greedy method. Number of items = 7, knapsack capacity **W = 15**, weight vector = **{2.5, 3, 5, 7, 1.5, 4, 1.9}**and profit vector = **{10.2, 5, 15, 7, 6, 18.7, 3}**.		5				
458	6	Solve the following Knapsack Problem using greedy method. Number of items = 5, knapsack capacity W = 100, weight vector = {50, 40, 30, 20, 10} and profit vector ={120, 230, 350, 460, 580}.		4				
459	6	Consider a situation where a man wants to carry some items in a bag. The capacity of bag is W = 70.Number of items = 5, weight vector = {10, 20, 30, 40, 50} and profit vector ={5, 10, 15, 20, 27}.solve using greedy knapsack method.		4				
460	6	Consider a situation where a man wants to carry some items in a bag. The capacity of bag is W = 70.Number of items = 5, weight vector = {15, 25, 30, 40, 50} and profit vector ={5, 10, 15, 20, 27}.solve using greedy knapsack method.		4				
461	6	Solve the following Knapsack Problem using greedy method. Number of items = 7, knapsack capacity W = 15, weight vector = {2, 3, 5, 7, 1, 4, 1}and profit vector = {10, 5, 15, 7, 6, 18, 3}.		5				
UNIT 7- Dynamic Programming								
TOPIC NAME:- Principle of Optimality (MCQS)								
462	7	If an optimal solution can be created for a problem by constructing optimal solutions for its subproblems, the problem possesses _____ property.	B	1	Overlapping subproblems	Optimal substructure	Memoization	Greedy
463	7	In dynamic programming, the technique of storing the previously calculated values is called _____	A	1	Memoization	Mapping property	Principle of Optimality	Caching
464	7	Which of the following problem can be solved using dynamic programming.	C	1	Prim MST	Kruskal MST	Longest Common Subsequence	Activity Selection Problem
TOPIC NAME:- Dynamic programming (MCQs)								
465	7	Which problems are solved using Dynamic programming?	D	1	Knapsack problem	LCS	Matrix chain multiplication	All of these
466	7	In dynamic programming, the technique of storing the previously calculated values is called _____	C	1	Saving value property	Storing value property	Memoization	Mapping
467	7	Which of the following problems is NOT solved using dynamic programming?	D	1	0/1 knapsack problem	Matrix chain multiplication problem	LCS	Fractional knapsack problem
468	7	Which of the following problem can be solved using dynamic programming	D	1	Prim MST	Knapsack	Longest Common Subsequence	Both B and C
TOPIC NAME:- Longest Common Subsequence (MCQs)								
469	7	Consider the following two sequences : X = < B, C, D, C, A, B, C >, and Y = < C, A, D, B, C, B > The length of longest common subsequence of X and Y is :	C	1	5	3	4	2
470	7	Consider two strings A = "qpqrr" and B = "pqprqrp". Let x be the length of the longest common subsequence (not necessarily contiguous) between A and B and let y be the number of such longest common subsequences between A and B. Then x + 10y = ___.	D	1	33	23	43	34

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
471	7	Consider two sequences X and Y : X = <0,1,2,1,3,0,1> Y = <1,3,2,0,1,0> The length of longest common subsequence between X and Y is	C	1	2	3	4	5
472	7	Consider two strings A = “qpqrr” and B = “pqprqrp”. Let x be the length of the longest common subsequence (not necessarily contiguous) between A and B and let y be the number of such longest common subsequences between A and B. Then x + 5y = ___.	A	1	19	34	33	43
473	7	The time complexity to find the longest common subsequence of two strings of length M and N is?	B	1	O(N)	O(M*N)	O(M)	O(log N)
TOPIC NAME:- Longest Common Subsequence (Examples)								
474	7	Determine Longest Common Subsequence of {N,E,E,L,A,M}and {E,N,G,I,N,E,E,R,I,N,G}		5				
475	7	Obtain longest common subsequence using dynamic programming. Given A = “acabaca” and B = “bacac”.		5				
476	7	Find the longest common subsequence for the following two sequences using dynamic programming. Show the complete process. X = 100101001 Y = 101001		5				
477	7	Determine LCS of {1,0,0,1,0,1,0,1} and {0,1,0,1,1,0,1,1,0}		5				
478	7	Find out LCS of A={K,A,N,D,L,A,P} and B = {A,N,D,L}		5				
479	7	Describe longest common subsequence problem. Find longest common subsequence of following two strings X and Y using dynamic programming. X=abbacdcba, Y=bcdbbcaac.		5				
480	7	Given two sequences of characters, P=<XYZYTXY> Q=<YTZXYX> Obtain the longest common subsequence.		5				
481	7	Given two sequences of characters, P=<ABCDABE>, Q=<CABE > Obtain the longest common subsequence.		5				
482	7	Consider two strings A = MLNOM and B = MNOM. Let x be the length of the longest common subsequence (not necessarily contiguous) between A & B then Obtain the longest common subsequence & the value of x and also show the step for finding C [4,3]		3				
483	7	Consider two strings A = "anandarmy" and B = "algorithms". Let ‘y’ be the length of the longest common subsequence (not necessarily contiguous) between A and B and let ‘x’ be the number of such longest common subsequences between A and B. Then 3x+2y = _____. (Note : Write the formula for finding LCS, Draw the entire table and also show the backtracking arrows in table for each such longest common subsequences between A and B)		4				
484	7	The program "LCS_DIFF" is used to compare two different versions of the same file, to determine what changes have been made to the file. It works by finding a longest common subsequence of the characters of the two versions of file (any character in the subsequence has not been changed) and displays is the remaining set of characters that have changed. File_version1: “nematode knowledge” File_version2: “empty bottle” If above two file versions are given input to LCS_DIFF program: a)Draw table, write LCS of two versions of a file b)What is output of program?		4				
485	7	Given two sequences of characters, P=<WKKWTKW> Q=<KKTWK> Find the longest common subsequence.		4				
486	7	Find the longest common subsequence for the following two strings X and Y using dynamic programming. X: ABCBDAB Y: BDCAB		4				
487	7	What do you mean by longest common subsequence? Also find longest common subsequence for {E,L,O,N,M,U,S,K} and {S,P,A,C,E,X}		4				
488	7	Find the longest common subsequence for the following two strings X and Y using dynamic programming. X = abbacdcba Y = bcdbbcaac. (Note : Write the formula for finding LCS, Draw the entire table and also show the backtracking arrows in table for each such longest common subsequences between X and Y)		4				
489	7	Find the longest common subsequence for the following two strings X and Y using dynamic programming. X: ABCBDAB Y: ACBAB		4				
490	7	Determine Longest Common Subsequence of {N,E,E,T,A}and {E,N,G,I,N,E,E,R}		3				
TOPIC NAME:- Matrix Chain Multiplication (MCQS)								
491	7	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	1	1500	2000	500	100
492	7	Let A1, A2, A3, and A4 be four matrices of dimensions 5 x 4, 4 x 6, 6 x 2, and 2 x 7, respectively. The minimum number of scalar multiplications required to find the product A1A2A3A4 using the basic matrix multiplication method is?	A	1	158	250	244	100
493	7	The time complexity to for MCM is _____	A	1	O(N^3)	O(M*N)	O(M)	O(log N)
TOPIC NAME:- Matrix Chain Multiplication (EXAMPLES)								
494	7	Find the total number of multiplications and optimal multiplication sequence for the following three matrices using dynamic programming. A = 2 x 5 B = 5 x 3 C = 3 x 4		5				
495	7	Given the four matrices P5x4, Q4x6, R6x2, T2x7. Find the optimal sequence for the computation of multiplication operation.		5				
496	7	Write equation for Matrix Chain Multiplication using Dynamic programming. Find out optimal sequence for multiplication: A1 [5 × 4], A2 [4 × 6], A3 [6 × 2], and A4 [2 × 7]. Also give the optimal solution.		5				
497	7	Find the optimal way of multiplying following matrices using dynamic programming. Also indicate optimal number of multiplications required. A:3 x 2, B: 2 x 5, C:5 x 4, D: 4 x 3, E: 3 x 3		5				
498	7	For the following chain of matrices find the order of parenthesization for the optimal chain multiplication (13,5,89,3,34).		5				
499	7	Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions is {5, 2, 4, 5}		5				
500	7	Find Optimal sequence of multiplication using dynamic programming of following matrices: A1 [10 × 100], A2 [100 × 5], A3 [5 × 50], and A4 [50 × 1]. List optimal number of multiplication and parenthesization of matrices.		4				

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
501	7	For the following chain of matrices, Find the order of parenthesizing for the Optimal Chain Multiplication (13,5,89,3,34).		4				
502	7	Assume that multiplying a matrix G1 of dimension p x q with another matrix G2 of dimension q x r requires pqr scalar multiplications. Computing the product of n matrices G1 G2 G3……Gn can be done by parenthesizing in different ways. Define GiGi+1 as an explicitly computed pair for a given paranthesization if they are directly multiplied. For example, in the matrix multiplication chain G1 G2 G3 G4 G5 G6 using parenthesization (G1 (G2G3))(G4(G5G6)), G2G3 and G5G6 are only explicitly computed pairs. Consider a matrix multiplication chain F1 F2 F3 F4 F5, where matrices F1, F2, F3, F4 and F5 are of dimensions 2 x 50, 50 x 3, 3 x 17, 17 x 1 and 1 x 1001, respectively. Then find the following: A) Explicitly computed pairs in the parenthesization of F1 F2 F3 F4 F5 that minimizes the total number of scalar multiplications (if there exists any) B) Matrix chain multiplication that minimizes the total number of scalar multiplications (Note : Construct the table for matrix chain multiplication and show the sequence of parenthesization as well)		5				
503	7	For the following chain of matrices, Find the order of parenthesizing for the Optimal Chain Multiplication (4, 10, 3, 12, 20, 7).		5				
504		Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions is {20, 2, 15, 40 ,4}		5				
505	7	Find the total number of multiplications and optimal multiplication sequence for the following three matrices using dynamic programming. X = 2 x 3 Y = 3 x 9 Z = 9 x 7		5				
506	7	Find an optimal parenthesizing of a matrix-chain product whose sequence of dimensions is {7, 2, 12, 5}		5				
507	7	Find a minimum number of multiplications required to multiply: A [1 × 5], B [5 × 4], C [4 × 3], D [3 × 2], and E [2 × 1]. Also, give optimal parenthesization.		5				
508	7	What is dynamic programming? Find the optimal sequence for following matrices. Find a minimum number of multiplications required to multiply: A A = 4 x 2, B = 2 x 5, C = 5 x 3. Also, give optimal parenthesization.		5				
TOPIC NAME:- Knapsack Problem (MCQS)								
509	7	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	1	160	200	170	90
510	7	Consider the Knapsack Problem: Given a set of n items, each with a weight wi and the value vi determine a subset of items to include in a collection so that the total weight is <= W which is a given limit and the total value is as large as possible. Consider the following statements in a situation such that we want to solve this problem using the Dynamic Programming paradigm. I. As per the dynamic Programming recurrence relation, the solution to ith subproblem depends on the solution to (i-1)th subproblem. II. The number of distinct subproblems is O(nW). Which of the above statements is/are correct?	D	1	I only	II only	Neither of both	Both I and II
TOPIC NAME:- Knapsack Problem (EXAMPLES)								
511	7	Solve the following 0/1 Knapsack Problem using Dynamic Programming. There are five items whose weights and values are given in following arrays. Weight w[] = { 1,2,5,6,7 } Value v[] = { 1,6,18, 22, 28 } Show your equation and find out the optimal knapsack items for weight capacity of 11 units.		5 or 2				
512	7	Solve following knapsack problem using dynamic programming algorithm with given capacity W=5, Weight and Value are as follows : (2,12),(1,10),(3,20),(2,15).		5				
513	7	Solve the following knapsack problem using dynamic programming. There are three objects, whose weights w(w1,w2,w3)={1, 2, 3} and values v(v1,v2,v3)={2, 3, 4} are given. The knapsack capacity M is 3 units.		5				
514	7	Solve the following knapsack problem using dynamic programming. Consider Items having Value(Rs.)={60,100,120} , Weight(KG)={10,20,30} respectively, Weight Capacity =50 KG.		5				
515	7	Find an optimal solution for the following 0/1 knapsack problem using dynamic programming. Weight w = (w1,w2,w3) = (2,3,3) Profit p = (p1,p2,p3) = (1,2,4) Knapsack capacity m = 6		5				
516	7	Suppose you are a thief planning to rob a store, and you have a knapsack with a maximum weight capacity of 7 units. In the store, there are items with varying weights and values. You want to maximize the total value of the items you can steal without exceeding the weight capacity of your knapsack. Item weights and values: Item | Weight | Value 1 | 2 | 3 2 | 3 | 4 3 | 4 | 5 4 | 5 | 8		5				
517	7	Solve the following knapsack problem using dynamic programming. There are four objects, whose weights w(w1,w2,w3,w4)={3, 4, 6, 5} and values v(v1,v2,v3,v4)={2, 3, 1, 4} are given. The knapsack capacity M is 8 units.		5				
518	7	Solve following knapsack problem using Dynamic Programming which consider the item for whole or none (strictly no need to take weight of any item in fraction and also not perform Pi/Wi for the calculation) with given capacity W=4, Weight and Value are as follows: (1,3), (3,4), (4,5). Also Show all the steps for finding the actual knapsack items.		3				
UNIT 8- Backtracking and Branch & Bound								
TOPIC NAME:- BACKTRACKING(MCQS)								

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
519	8	Which statement is true for Backtracking algorithm? 1. A piece of sufficient information is not available to make the best choice, so we use the backtracking strategy to try out all the possible solutions. 2. Each decision leads to a new set of choices. Then again, we backtrack to make new decisions. In this case, we need to use the backtracking strategy.	C	1	1 is True & 2 is False	1 is False & 2 is True	Both 1 & 2 are true	Both 1 & 2 are false
520	8	Which of the problems can be solved by backtracking method?	A	1	n-queen problem & subset sum problem	Job Scheduling Problem	Prim's & Kruskal's problem	LCS problem
521	8	Which one of the following is an application of the backtracking algorithm?	D	1	Finding the shortest path	Finding the efficient quantity to shop	Ludo	Crossword
522	8	Backtracking algorithm is implemented by constructing a tree of choices called as?	B	1	State-chart tree	State-space tree	Node tree	Backtracking tree
523	8	_____ enumerates a list of promising nodes that could be computed to give the possible solutions of a given problem.	C	1	Exhaustive search	Brute force	Backtracking	Divide and conquer
524	8	How many possible solutions for 7-Queen problem?	D	1	0	10	4	40
525	8	_____is a generated node that is not to be expanded or explored any further. All children of a node have already been expanded.	B	1	E-node	Dead node	Live node	Problem node
526	8	Which statement is true for Backtracking algorithm? 1. A piece of sufficient information is not available to make the best choice, so we use the backtracking strategy to try out all the possible solutions. 2. Each decision leads to a new set of choices. Then again, we backtrack to make new decisions. In this case, we need to use the backtracking strategy 3. Backtracking enumerates a list of promising nodes that could be computed to give the possible solutions of a given problem.	A	1	1,2 & 3 are True	1 is True & 2,3 is False	1,2 is True & 3 is False	1,3 are True & 2 is False
527	8	In n-queen problem, how many values of n does not provide an optimal solution?	B	1	1	2	3	4
528	8	I.a node which has been generated and all of whose children are not yet been generated. II.a node that is either not to be expanded further, or for which all of its children have been generated III.will be used to kill live nodes without generating all their children. IV.A node currently being expanded/ explored. V.It is depth first node generation with bounding functions. VI.It is a method in which E-node remains E-node until it is dead. Statements I, II, III, IV, V, VI respectively and correctly identified as:	B	1	Live node, E-node, Bounding function, Dead node, Backtracking, Branch and bound.	Live node, Dead node, Branch and bound, E-node, Backtracking, Bounding function	E-node, Live node, Bounding function, Dead node, Backtracking, Branch and bound.	E-node, Dead node, Bounding function, Live node, Branch and bound, Backtracking.
529	8	The problem of placing n queens in a chessboard such that no two queens attack each other is called as?	A	1	n-queen problem	eight queens puzzle	four queens puzzle	1-queen problem
TOPIC NAME:- BACKTRACKING(EXAMPLES)								
530	8	Explain Backtracking Method. What is N-Queens Problem?		3				
531	8	Give solution of 4-Queens Problem using Backtracking Method.		5				
532	8	Give solution of 8-Queens Problem using Backtracking Method.		5				
533	8	Give solution of 5-Queens Problem using Backtracking Method.		5				
534	8	For a feasible sequence(7,5,3,1),solve 8-Queens problem using backtracking.		7				
535	8	How many solutions possible for 5-Queen problem. Write down any two possible solution sequence for 5-Queen problem and also represent in 5*5 chess board with no one queen threat to each other.		2				
536	8	Give any one solution of 4-Queen's Problem using Backtracking Method. Show all the nodes of state space tree until each E node satisfy the implicit constraints of N-Queen problem to find your solution starting from column 1 for Queen 1.		2				
537	8	Give solutions of 4-Queen's Problem using Backtracking Method. Show all the nodes of state space tree until each E node satisfy the implicit constraints of N-Queen problem. Also show the solution vector for each solution.		3				
TOPIC NAME:- BRANCH AND BOUND (MCQS)								
538	8	Branch and bound is an algorithm design paradigm which is generally used for solving _____problems	A	1	combinatorial optimization	Sequential Optimization	Parallel Optimization	Both B & C are true
539	8	Branch and bound is a _____	D	1	data structure	sorting algorithm	type of tree	problem solving technique
540	8	Time complexity of 0/1 knapsack problem in best case is _____ and in worst case is	A	1	O(n), $O(2^n)$	$O(n^2)$, $O(2^n)$	$O(2^n)$, $O(2^n)$	O(n), O(1)
TOPIC NAME:- BRANCH AND BOUND (EXAMPLES)								
541	8	Solve the following 0/1 Knapsack Problem using Branch & Bound. There are four items whose weights and values are given in following arrays. Weight w [] = {2,4,6,9} Value v [] = {10, 10, 12, 18} Show your equation and find out the optimal knapsack items for weight capacity of 15 units.		5				
542	8	Solve the following 0/1 Knapsack Problem using Branch & Bound. items=3 whose weights and values are given in following arrays. Weight w [] = {4,7,5} Value v [] = {40, 42, 25}find out the optimal knapsack items for weight capacity of 10 units.		5				
543	8	Differentiate branch and bound and back tracking algorithm		4				
544	8	Let us consider the list of provided items are shown in the following table. W=10 A) Find the maximum profit gain by applying knapsack using branch and bound method. B) Show the item vector for the selected items to gain the maximum profit item / Weight / Profit 1 / 1 / 40 2 / 2 / 30 3 / 3 / 25 4 / 5 / 15 5 / 4 / 12		4				
545	8	A thief enters a house for robbing it. He can carry a maximal weight of 5 kg into his bag. There are 4 items in the house with the following weights and values. What items should thief take if he either takes the item completely or leaves it completely? Solve using 0/1 knapsack. Item / Weight (kg) / Value ($) Mirror / 2 / 3 Silver nugget / 3 / 4 Painting / 4 / 5 Vase / 5 / 6		4				

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546	8	Weight w [] = {4,7,5,3} Value v [] = {40, 42, 25,12} find out the optimal knapsack items and profit for weight capacity and of 10 units and show solution vector using branch and bound approach. Show formula for bound calculation and all dead ends in state space tree.		4				
TOPIC NAME:- SUBSET SUM (MCQS)								
547	8	The problem of finding a subset of positive integers whose sum is equal to a given positive integer is called as?	B	1	n- queen problem	subset sum problem	knapsack problem	hamiltonian circuit problem
548	8	Which of the problems can be solved by backtracking method?	A	1	Subset Sum	Rabin Karp	Naïve	Binary Search
549	8	For S={10, 7, 5, 18, 12, 20, 15} to generate sum X =35, How many total solutions of length 3 are there in solution set S'?	B	1	2	3	4	5
550	8	What will be the output for the given set and sum using subset sum method where set[ ] = {3, 34, 4, 12, 5, 2} and exact sum = 30	D	1	15,5	10,20	8,12,10	NULL
TOPIC NAME:- SUBSET SUM (EXAMPLES)								
551	8	What will be the output for the given set and sum using subset sum method. set[] = {3, 34, 4, 12, 5, 2}, sum = 9		5				
552	8	What will be the output for the given set and sum using subset sum method where set [ ] = {10, 7, 5, 18, 12, 20, 15} and exact sum = 35. Note: Show all the solutions for the given set and exact sum.		5				
553	8	A) What will be the output for the given set and sum using subset sum method. set[] = {1,3,4,5}, sum = 8 B) What is the best-case time complexity in Naïve string-matching algorithm? Assuming length of text as n and length of pattern as m.		3.5				
554	8	What will be the output for the given set and sum using subset sum method. set[] = {3, 34, 4, 12, 5, 2}, sum = 30		5				
TOPIC NAME:- ASSIGNMENT PROBLEM (EXAMPLES)								
555	8	In a computer center after studying carefully the three expert programmers, the head of computer center, estimates the computer time in minutes required by the experts for the application programmers as follows: *Programmes* Programmes: 1. 120 100 80; 2. 80 90 110; 3. 110 140 120 (A B C)		3				
556	8	Solve the following Task Assignment problem for minimization using following cost matrix.(Cost matrix represents cost of Task T (column wise T1, T2, T3) performed by Person P (row wise P1, P2, P3)). Mention lower bound and optimal cost and sequence in which manner we can assign task for best result. $C = \begin{matrix} 6 & 9 & 5 \\ 4 & 8 & 3 \\ 5 & 11 & 6 \end{matrix}$		3				
557	8	A department has four employees with four jobs to be performed. The time in hours each man will take to perform each job is given in the effectiveness matrix. A) How should the jobs be allocated one per employee so as to minimize the total man- hours? B) What will be the minimum number of hours needed to complete each job by assigning one job different person? P1: 90 80 75 70; P2: 35 85 55 65; P3: 125 95 90 95; P4: 45 110 95 115 (A B C D)		4				
558	8	Solve the following Task Assignment problem for minimization using following cost matrix.(Cost matrix represents cost of Task T performed by Person P. T1 T2 T3 P1 10 20 25 P2 20 23 26 P3 12 16 25		5				
559	8	A department has five employees with five jobs to be performed. The time in hours) each man will take to perform each job is given in the effectiveness matrix. How should the jobs be allocated one per employee so as to minimize the total man- hours? *Employees* Job: A 10 5 13 15 16; B 3 9 18 13 6; C 10 7 2 2 2; D 7 11 9 7 12; E 7 9 10 4 12 (I II III IV V)		5				
560	8	A department has three employees with three tasks to be performed. The time in hours each employee will take to perform each task is given in the effectiveness matrix. What will be the minimum number of hours needed to complete each task by assigning single task to per person?. A: 10 8 12; B: 9 22 15; C: 18 12 6 (T1 T2 T3)		4				

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
561	8	Solve the following Task Assignment problem for minimization using following cost matrix.(Cost matrix represents cost of Task T (column wise T1, T2, T3) performed by Person P (row wise P1, P2, P3)). Mention lower bound and optimal cost and sequence in which manner we can assign task for best result. 2 8 3 1 6 4 7 0 5		4				
562	8	Solve the following Task Assignment problem for minimization using following cost matrix. (Cost matrix represents cost of Task T (column wise T1, T2, T3, T4) performed by Person P (row wise P1, P2, P3, P4)). Mention lower bound and optimal cost and sequence in which manner we can assign task for best result T1 T2 T3 T4 P1 9 2 7 8 P2 6 4 3 7 P3 5 8 1 8 P4 7 6 9 4		5				
563	8	Solve the following Task Assignment problem for minimization using following cost matrix.(Cost matrix represents cost of Task T performed by Person P.) Task1 Task2 Task3 P1 9 2 7 P2 6 4 3 P3 5 8 1		5				
564	8	There 4 vehicles and 4 roads in a city. Cost of passing of a vehicle from a particular road is given in following table. If only one vehicle is allowed to pass from each road such that no vehicle will pass more than one road, what is minimum cost of assignment of vehicle to a road. Illustrate assignment using state space tree Road-X Road-Y Road-Z Road-W Van 14 8 34 14 Bus 12 10 28 32 Jeep 22 18 8 26 Car 11 24 21 21		5				
565	8	Solve the following Task Assignment problem for minimization using following cost matrix. (Cost matrix represents cost of Job J (column wise J1, J2, J3, J4) performed by Person P (row wise P1, P2, P3, P4)). Mention lower bound and optimal cost and sequence in which manner we can assign task for best result. Job 1 Job 2 Job 3 Job 4 Person 1 (A) 11 4 9 10 Person 2 (B) 8 6 5 9 Person 3 (C) 7 10 3 10 Person 4 (D) 9 8 11 6		5				
566	8	Let us consider the list of provided items are shown in the following table. The job is to pick the subset of the above given item table such that the total weights is less than 19 and their total value is maximized. A) Find the maximum profit gain by applying knapsack using branch and bound method. B) Show the item vector for the selected items to gain the maximum profit. Item number / Weights in Kgs / Value in Rupees 1 / 5 / 25 2 / 2 / 12 3 / 3 / 6 4 / 6 / 24 5 / 6 / 21		3				
UNIT 9- STRING MATCHING ALGORITHM								
TOPIC NAME:- Naïve method								
567	9	How many comparisons of character wise equality will be evaluated to FALSE, for the pattern P=0001 in the text T=000010001010001, using Naïve Method. Considering that first inequality in each shift will result into no further character comparisons	A	1	10	15	8	2
568	9	Show the comparisons the naive string matcher makes for the pattern P=0001 in the text T=000010001010001		3				
569	9	Write a time complexity of naïve String matching algorithm and perform string matching for given pattern P = “ACD” Text T = “CACDACAACDAC”		5				
570	9	txt[] = “THIS IS A TEST TEXT”, pat[] = “TEST” Find valid shift using Naïve string matching algorithm.		3				
571	9	Suppose T = 1011101110 , P = 111 Find all the Valid Shift using Naïve string matching algorithm.		3				
572	9	Show the comparisons the naive string matching makes for the pattern P=SIMPLE in the text T=THIS IS A SIMPLE EXAMPLE		2				
573	9	Suppose T = HACKHACKHACKHACKITHACKEREARTH P = HACKHACKIT Find all the Valid Shift using Naïve string matching algorithm		2				
574	9	What is the best-case time complexity in Naïve string-matching algorithm? Assuming length of text as n and length of pattern as m.		2				
TOPIC NAME:- Rabin Karp Algorithm								
575	9	What is the basic principle in Rabin Karp algorithm?	B	1	sorting	hashing	backtracking	optimality

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
576	9	Find the number of spurious hits in the given text string if we assumes a=1, b=2, c=3, d=4…z=26. Pattern: dba (Hash function is d+b+a = 4+2+1 = 7) Text: ccaccadba	B	1	1	5	6	2
577	9	What is a Rabin and Karp Algorithm?	B	1	Shortest Path Algorithm	String Matching Algorithm	Minimum spanning tree Algorithm	Approximation Algorithm
578	9	Hash of 73992 is 9 with base 10. If prime number used for calculating hash is 13 and hash function used is mod, what is hash of 39921?	B	1	5	11	7	4
579	9	What is best expected running time of Rabin-Karp algorithm?	A	1	O(m+n)	O(n)	O(n-m+1)	O(1)
580	9	Which of the Following is correct for Rabin-karp If n is the length of text(T) and m is the length of the pattern(P) identify the correct matching algorithm. I. for s=0 to n-m do if p==ts then if P[1..m]==T[s+1..s+m] then print “Pattern occurs with shift” s II. for s=0 to m do if p==ts then if P[1..m]==T[s+1..s+m] then print “Pattern occurs with shift” s III. for s=0 to m do if p==ts then if P[1..m]==T[s+1..s+m] then print “Pattern occurs with shift” s IV. for s=0 to n-m do if p!=ts then if P[1..m]==T[s+1..s+m] then print “Pattern occurs with shift” s	A	1	I	II	III	IV
581	9	Explain spurious hits in Rabin-Karp string matching algorithm with example. Working modulo q=13, how many spurious hits does the Rabin-Karp matcher encounter in the text T = 2359023141526739921 when looking for the pattern P = 31415?		5				
582	9	Explain spurious hits in Rabin-Karp string matching algorithm with example. Working modulo q=4, how many spurious hits does the Rabin-Karp matcher encounter in the text T = 2359023141526739921 when looking for the pattern P = 31415?		5				
583	9	What is the prefix array of given pattern P = a b a b a c a?		2				
584	9	Explain how Rabin-Karp string matching algorithm with the following example. For working modulo q=11, how many spurious hits does the Rabin Karp matcher encounter in the text T = 3468034252646840040 when looking for the pattern P = 42526? (Show all the steps) A) At which shifts the spurious hits are taking place? B) At which index the string gives valid hit?		5				
585	9	Find the number of spurious hits in the given text string if we assumes A=1, B=2, C=3, D=4…Z=26. Pattern: DBAC (Hash function is D+B+A+C= 4+2+1+3 = 10) Text: CADBCDABBCDBACDC		5				
586	9	Working modulo q=11, how many spurious hits does the Rabin-Karp matcher encounter in the text T=3141592653589793 when looking for the pattern P=26?		5				
TOPIC NAME:- KMP algorithm								
587	9	Which of the following is a sub string of “SANFOUNDRY”?	B	1	SANO	FOUND	SAND	FOND
588	9	What is the worst case time complexity of KMP algorithm for pattern searching (m = length of text, n = length of pattern)?	C	1	O(n)	O(n*m)	O(m+n)	O(log n)
589	9	Which of the following can be a suffix of the string “Indianfood”?	C	1	I	Indian	food	doof
590	9	The KMP algorithm’s First step is _____?	B	1	Build Postfix Array	Build Prefix Array	Count Pattern length	Match the Pattern
591	9	What is the time Complexity for building a pi table for given pattern of length m and Text of length n, in KMP method?	C	1	O(n)	O(n*m)	O(m)	O(log n)
592	9	The concept of prefix and suffix is used in which of the following algorithms?	D	1	Rabin Karp	subset sum	LCS	KMP
593	9	What will be the value of Pie table for pattern ababada	F	1	123010	0120013	1234567	4567897
594	9	Which of the following is a sub string of “STRING”?	A	1	TRIN	TSGN	TRNS	STNG
595	9	Which of the following is true.	A	1	DES is substring of DESIGN	DSI is substring of DESIGN	NGD is substring of DESIGN	IES is substring of DESIGN
596	9	Write down time complexity preprocessing of Knuith-Morris-Pratt algorithm for string matching. Compute the prefix function for the pattern: ababbabbabbababbabb and mention the highest length of common prefix suffix string.		5				
597	9	Draw the pi table for the following pattern with necessary steps. Pattern[] = ABABABCABABA		3				
598	9	The text is “aaabcabccabcaaba” and the pattern to be found is “aaba”.Use the KMP algorithm show steps to search the given pattern inside the given text. Also write down the index number at which the pattern founds		3				
599	9	Text : AAAABAAAAABBBAAAAB Pattern: AAAB Use KMP Algorithm to solve the matching pattern. Build the Longest common prefix-suffix table (PI table) and match the pattern with text using the PI table. Also write down the index number at which the pattern founds.		4				
600	9	You have received a long message from your friend that contains a code. Use KMP algorithm to find is the code is present in the message or not. If present provide the index number. Consider message as text and code as pattern. Message = ZAZAZAAZAZABAZA CODE = ZAZABAZA		4				
601	9	Consider the following Text and Pattern given below: Text: ABABCABCABABABD Pattern: ABABD Build the Longest common prefix-suffix table (PI table) and match the pattern with text using the PI table. Also write down the index number at which the pattern founds.		4				
602	9	A = bacbcbabcacba and B=bcbca, prepare longest prefix suffix table. Find all occurrences of B in A using prepared table. Show all steps/ complete tracing.		3				

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603	9	Consider the following Text and Pattern given below: Text: AABAACAADAABAABA Pattern: AABA Build the Longest common prefix-suffix table (PI table) and match the pattern with text using the PI table. Also write down the index number at which the pattern founds		3				
604	9	Consider the following Text and Pattern given below: Text: ABC ABCDAB ABCDABCDABDE Pattern: ABCDABD Build the Longest common prefix-suffix table (PI table) and match the pattern with text using the PI table. Also write down the index number at which the pattern founds.		5				
UNIT 10- PROBLEM CLASSES								
TOPIC NAME:- P, NP and NP hard								
605	10	_____ is the class of decision problems that can be solved by non-deterministic polynomial algorithms.	A	1	NP	P	complete	hard
606	10	NP stands for _____	A	1	Non-determinstc polynomial	non-divided polynomial	no programming	none of these
607	10	A problem which is both _____ and _____ is said to be NP complete.	B	1	P, NP	NP, NP Hard	P, NP hard	P, P complete
608	10	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?	B	1	R is NP-complete	R is NP-hard	Q is NP-complete	Q is NP-hard
609	10	Let X be a problem that belongs to the class NP. Then which one of the following is TRUE?	C	1	There is no polynomial time algorithm for X.	If X can be solved deterministically in polynomial time, then P = NP.	If X is NP-hard, then it is NP-complete.	X may be undecidable
610	10	Choose the correct answer for the following statements: I. The theory of NP–completeness provides a method of obtaining a polynomial time for NPalgorithms. II. All NP-complete problem are NP-Hard.	A	1	I is FALSE and II is TRUE	I is TRUE and II is FALSE	Both are TRUE	Both are FALSE
611	10	Which of the following is true.?	A	1	P is subset of NP	NP is subset of P	P and NP are equal	NP is subset of NP hard
612	10	Assuming P != NP, which of the following is true ?	B	1	NP-complete = NP	NP-complete intersection P =Φ	NP-hard = NP	P = NP-complete
613	10	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	1, 2 and 3	1 and 2 only	2 and 3 only	1 and 3 only
614	10	In Which Algorithm the Next State to be followed is fixed?	B	1	Non deterministic	Deterministic	Non Polynomial	Both A & B
615	10	How many conditions have to be met if an NP- complete problem is polynomially reducible?	B	1	1	2	3	4
616	10	Which of the following problems are classified under P class ?	D	1	sorting	Kruskal's algorithm	Floyd warshall algorithm	Dijkstra algorithm
617	10	Statement: A problem D is called NP-Complete if… Which of the following option is/are Correct for the above statement?	D	1	It is in NP	It is reducible in polynomial time	It is neither traceable and nor solvable.	Both a and b
618	10	Which of the Following is Correct for the given Statement? Statement: A problem D is called NP-Complete if?	A	1	It belongs to Class NP	Every Problem in NP can also be solved in Polynomial time	Problem in NP Complete Must not solved in Polynomial time	Both A and B
619	10	Problems that can be solved in polynomial time are known as?	A	1	tractable problems	intractable problems	undecidable problems	decidable problems