

Model Question Paper with effect from 2023-24 (CBCS Scheme)

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Fourth Semester B.E. Degree Examination Analysis and Designs of Algorithms

TIME: 03 Hours

Max. Marks: 100

Note: 01. Answer any FIVE full questions, choosing at least ONE question from each MODULE.

Module -1			BL	Marks														
Q.01	a	Define algorithm. Explain asymptotic notations Big Oh, Big Omega and Big Theta notations	L2	08														
	b	Explain the general plan for analyzing the efficiency of a recursive algorithm. Suggest a recursive algorithm to find factorial of number. Derive its efficiency	L2	08														
	c	If $t1(n) \in O(g1(n))$ and $t2(n) \in O(g2(n))$, then show that $t1(n) + t2(n) \in O(\max\{g1(n), g2(n)\})$.	L2	04														
OR																		
Q.02	a	With neat diagram explain different steps in designing and analyzing an algorithm	L2	08														
	b	Explain the general plan for analyzing the efficiency of a non-recursive algorithm. Suggest a non-recursive algorithm to find maximum element in the list of n numbers. Derive its efficiency	L2	08														
	c	With the algorithm derive the worst case efficiency for Bubble sort	L2	04														
Module-2																		
Q.03	a	Explain the concept of divide and conquer. Design an algorithm for merge sort and derive its time complexity	L2	10														
	b	Design an insertion sort algorithm and obtain its time complexity. Apply insertion sort on these elements. 25,75,40,10,20.	L3	10														
OR																		
Q.04	a	Explain Strassen's matrix multiplication and derive its time complexity	L2	10														
	b	Design an algorithm for quick sort algorithm. Apply quick sort on these elements. 25,75,40,10,20,05,15	L3	10														
Module-3																		
Q.05	a	Define AVL Trees. Explain its four rotation types	L2	10														
	b	Construct bottom up heap for the list 2,9,7,6,5,8. Obtain its time complexity	L3	10														
OR																		
Q.06	a	Define heap. Explain the properties of heap along with its representation.	L2	10														
	b	Design Horspools algorithm for string matching. Apply Horspools algorithm to find the pattern BARBER in the text: JIM SAW ME IN A BARBERSHOP	L3	10														
Module-4																		
Q.07	a	Construct minimum cost spanning tree using Kruskals algorithm for the following graph.	L3	10														
b	What are Huffman Trees? Construct the Huffman tree for the following data.			L3	10													
	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Character</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>-</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>0.5</td> <td>0.35</td> <td>0.5</td> <td>0.1</td> <td>0.4</td> <td>0.2</td> </tr> </tbody> </table> Encode DAD-CBE using Huffman Encoding.			Character	A	B	C	D	E	-	Probability	0.5	0.35	0.5	0.1	0.4	0.2	
Character	A	B	C	D	E	-												
Probability	0.5	0.35	0.5	0.1	0.4	0.2												

Fact Model Question Paper

Michael Rajnik



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