Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

Reexamination Synoptic
Jan 2020

Max. Marks: 60 | **Duration: 3 Hrs**
Class: S.E. | **Semester: IV**
Course Code: IT41 / CE41 | **Branch: IT/COMP**
Name of the Course: Design And Analysis of Algorithm

Instructions:
(1) All Questions are Compulsory
(2) Draw neat diagrams
(3) Assume suitable data if necessary.

Question No.	Question	Max. Marks	CO-BL-PI
Q. 1 a)	Define Big O, Big Ω and explain with diagram. **Synoptic: For each definition with diagram….2.5 Mark**	*5*	**1-1-2.1.3**
Q. 1 b)	Solve the given recurrence using Master Method Theorem: i) $T(n) = 4T(n/2) + n^2$ ans → $T(n) = \Theta(n^2 \log n)$ ii) $T(n) = 3T(n/3) + n/2$ ans → $T(n) = \Theta(n \log n)$ **Synoptic: For each problem …2.5 Marks**	*5*	**1-3-2.1.2**
Q. 1 c)	Write an algorithm for Binary Search. Explain with example. Comment on its time complexity. **Synoptic: algorithm…2 marks , Example : 2 Marks** **Time Complexity ..1 mark**	*5*	**2-2-2.1.3**
Q. 2 a)	**Solve the following 0/1 knapsack problem with dynamic Programming** **There are 5 Objects O1 ,O2 , O3 , O4 , O5. Their corresponding details are given below.** **Weights : 2 , 3 , 3 , 4 , 6 Kg** **Values/profit : 1 , 2 , 5 , 9 , 4 Rs.** **Knapsack Capacity (M) = 10 Kgs.** **Calculate Maximum profit and Show which objects will be selected** **Ans:** (table below) **Synoptic: For Calculation of profit : 5 Marks , For finding the Objects: 3 Marks**	*8*	**3-3-2.2.3**

	0	1	2	3	4	5	6	7	8	9	10
2(1)	0	0	1	1	1	1	1	1	1	1	1
3(2)	0	0	1	2	2	3	3	3	3	3	3
3(5)	0	0	1	5	5	6	7	7	8	8	8
4(9)	0	0	1	5	9	9	10	14	14	15	16
6(4)	0	0	1	5	9	9	10	14	14	15	16

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Q2. b)	Consider the following set of frequencies. A=1, B=2, C=3, D=4, E=5, F=6, G=7 Find the Huffman code for the same. **Synoptic: For each letter correct coding : 1 Marks**	*7*	**4-3-1.1.2**
Q.3 a)	State algorithm for finding Longest common Subsequence. (LCS). Find Longest common subsequence for following problem Str1 = ABBCDEB Str2 = BAABCEB **Synoptic: For Algorithm of LCS: 3 marks , For Correct table and Constructing the final answer 7 Marks**	*10*	**3-3-2.2.3**
Q.3 b)	Explain Backtracking approach in general . Write algorithm for the N queen problem. Apply it to solve 4 queen problem. **Synoptic: backtracking approach: 2 mark , N queen problem: 2 Mark , applying it for 4 queen Problem: 1 Mark** **OR** Explain Branch and Bound strategy in general. **Synoptic: For explaining Branch and Bound strategy: 5 Marks**	*5*	**5-3-2.2.3**
Q4 a)	List the different String Matching Algorithms. And explain naïve string matching algorithm along with example. Comment on time complexity. **Synoptic: For Listing algorithms of string matching: 2 Marks,** **Naive string Matching example: 4 Marks** **Time complexity: 2 Marks** **OR** Write an algorithm of String matching with Finite Automata. Give one example of it. **Synoptic: For algorithm: 4 Marks , For example : 4 Marks**	*8*	**1-3-2.2.4**
Q.4b)	Solve the following linear programming using Simplex algorithm. Maximise Z = 4x + y. subject to the constraints x + y <= 50 , 3x + y <= 90 , X >= 0 , y >= 0 **Synoptic: Correctly solving the problem: 7 Marks** (0, 0) → 0 (30, 0) → 120 ← Maximum (20, 30) → 110 (0, 50) → 50	*7*	**6-3-2.2.3**