SET – 2

Code No.: 22CSPC41 | R22 | H.T.No. 99R01A0545

CMR INSTITUTE OF TECHNOLOGY: HYDERABAD
UGC AUTONOMOUS
B.Tech. IV – Semester- I - Mid Term Examinations – April – 2024
Design and Analysis of Algorithms
(Common to CSE, CSE(AI&ML), CSE(DS),CSE(CS),AI&ML)

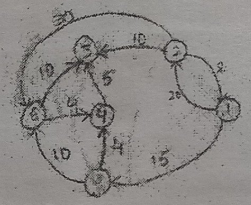
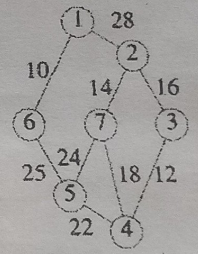
[Time: 120 Minutes] **[Max. Marks: 30]**

Note:
1. This question paper contains two parts A and B.
2. Part A is compulsory which carries 5 marks. Answer all questions in Part A.
3. Part B consists of 5 questions. Answer all 5 questions. Each question carries 5 marks
4. Illustrate your answers with NEAT sketches wherever necessary.

PART-A **5 x 1M=5M**

S. No.		Question	BTL	CO	PO
1	a	What do you mean by Little Oh Notation?	1	1	2,3,12
	b	Define: Time complexity with example.	1	1	2,3,12
	c	What is Articulation point in biconnected components?	1	2	2,3,12
	d	What is the best,worst and average time complexity of binary search in successful search?	1	2	2,3,12
	e	Recall the general principle of greedy method.	1	3	2,3,12

PART-B **5 x 5M=25M**

S. No.	Question	BTL	CO	PO
2	Explain in detail about Big Oh notation and omega notation with examples.	2	1	2,3,12
	OR			
3	Compare performance measurement and performance estimation of algorithms.	2	1	2,3,12
4	Recall the algorithm for matrix addition and find the time complexity of the algorithm using count method.	1	1	2,3,12
	OR			
5	What is space complexity? Illustrate with an example for fixed and variable part in space complexity?	2	1	2,3,12
6	Compare BFS and DFS algorithm with an example graph and denote its time complexities.	2	2	2,3,12
	OR			
7	Interpret the time complexity of merge sort where T(n)=2T(n/2)+cn	2	2	2,3,12
8	Summarize the concept of biconnected components with an example.	2	2	2,3,12
	OR			
9	Explain about Strassen's matrix multiplication with an example and show its time complexity is $O(n^{2.81})$.	2	2	2,3,12
10	Formulate the single source shortest path problem with greedy method and find the optimal solution where source is 1 and destination is 6. 	6	3	2,3,12
	OR			
11	Define spanning tree. Compute a minimum cost spanning tree for the graph of figure using prim's algorithm. 	1	3	2,3,12

Code No.:20-CS-PC-222

R20 | H.T.No. | | | R | 0 | | | | | | | | SET-1

CMR INSTITUTE OF TECHNOLOGY: HYDERABAD

UGC AUTONOMOUS

II–B.Tech. II–Semester- II - Mid Term Examinations – June – 2022

DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE, CSD & CSM)

[Time: 90 Minutes] **[Max. Marks: 25]**

Note:
1. This question paper contains two parts A and B.
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 3 questions. Answer all 3 questions. Each question carries 5 marks and may have sub questions.
4. Illustrate your answers with NEAT sketches wherever necessary.

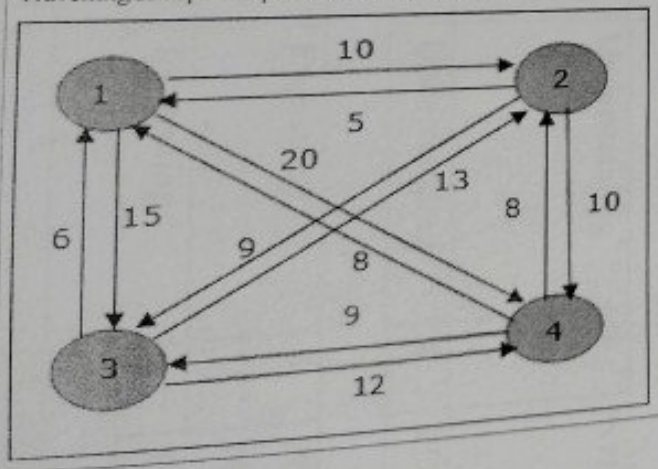
PART-A

5 x 2M=10M

S. No.		Question	BTL	CO	PO
1	a	What do you mean by Principle of Optimality?	1	3	2,3,12,13
	b	Define State Space tree and Solution tree	1	4	2,3,12,13
	c	Explain Implicit and Explicit Constraints	1	4	2,3,12,13
	d	What are tractable problems?	2	4	2,3,12,13
	e	What is Deterministic algorithm?	1	5	2,3,12,13

PART-B

3 x 5M=15M

S. No.	Question	BTL	CO	PO
2	Construct an optimal Binary search tree from the following data : n=4 , (a1,a2,a3,a4)=(do, if, int , while) and p(1:4)=(3,3,1,1) and q(0:4)=(2,3,1,1,1).	6	3	2,3,12,13
	OR			
3	Construct an optimal tour of the following graph using Travelling salesperson problem. Source node is 1. 	6	3	2,3,12,13
4	Explain 4-Queensproblem with State Space Tree and Solution Tree.	5	4	2,3,12,13
	OR			
5	Determine the solution for the given 0/1 Knapsack instance using LC Branch-and-Bound: n = 4, m = 15, P[]= {10, 10, 12, 18}, W[]= {2, 4, 6, 9}	5	4	2,3,12,13
6	Explain NP-Hard and NP-Complete Problems with Examples	5	5	2,3,12,13
	OR			
7	Explain Non-Deterministic algorithms with an example	5	5	2,3,12,13

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CMR INSTITUTE OF TECHNOLOGY: HYDERABAD

UGC AUTONOMOUS

II–B.Tech. II–Semester-I - Mid Term Examinations – April – 2022

DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE, CSD & CSM)

[Time: 90 Minutes] **[Max. Marks: 25]**

Note:
1. This question paper contains two parts A and B.
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 3 questions. Answer all 3 questions. Each question carries 5 marks and may have sub questions.
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PART-A **5 x 2M=10M**

S. No.		Question	BTL	CO	PO
1	a	What are the properties of an Algorithm?	1	1	2,3,12,13
	b	Define Performance Analysis	1	1	2,3,12,13
	c	Explain general Divide-and-Conquer approach	2	2	2,3,12,13
	d	What do you mean by Bi-Connected Component?	1	2	2,3,12,13
	e	What is Greedy Method?	1	3	2,3,12,13

PART-B **3 x 5M=15M**

S. No.	Question	BTL	CO	PO
2	Explain Pseudo code for writing Algorithm.	5	1	2,3,12,13
	OR			
3	Explain Time Complexity with examples	5	1	2,3,12,13
4	Discuss simple UNION and Weighted UNION algorithms	6	2	2,3,12,13
	OR			
5	Perform the Quick sort on the given array: 34, 21, 76, 23, 99, 32, 77, 55, 43.	6	2	2,3,12,13
6	Solve the following problem using the Job sequencing with dead line algorithm and also find the optimal solution for the instance n=7, (P1, P2, ..., P7)=(3,5,20,18,1,6,30) and (D1,D2, ...,D7)=(1,3,4,3,2,1,2).	6	3	2,3,12,13
	OR			
7	Write recursive and non-recursive algorithm for Binary search	6	2	2,3,12,13

o.: 20-CS-PC-222 SET-2

R20 H.T.No. | | | R | 0 | | | | | |

CMR INSTITUTE OF TECHNOLOGY: HYDERABAD
UGC AUTONOMOUS
II–B.Tech. II–Semester-I - Mid Term Examinations – April – 2022
DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSE, CSD & CSM)

90 Minutes] **[Max. Marks: 25]**

1. This question paper contains two parts A and B.
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 3 questions. Answer all 3 questions. Each question carries 5 marks and may have sub questions.
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PART-A

5 x 2M=10M

o.	Question	BTL	CO	PO
a	Difference between Priori and Posteriori analysis	2	1	2,3,12,13
b	Define Pseudo code?	1	1	2,3,12,13
c	Define articulation point?	1	2	2,3,12,13
d	Define Spanning tree with an example.	1	2	2,3,12,13
e	What is Feasible and Optimal Solution?	1	3	2,3,12,13

PART-B

3 x 5M=15M

No.	Question	BTL	CO	PO
?	Discuss different types of asymptotic notations with suitable examples	6	1	2,3,12,13
	OR			
3	Discuss Space Complexity with example	6	1	2,3,12,13
4	Determine simple FIND and Collapsing FIND algorithm with example	5	2	2,3,12,13
	OR			
5	Evaluate the following problem using Merge sort algorithm. Also show the tree of calls for Merge sort. 25, 57, 48, 37, 12, 92, 25, 86, 33?	5	2	2,3,12,13
6	Solve the following Greedy Knapsack problem with the given details and knapsack capacity = 60 kg	6	3	2,3,12,13

Item	Weight	Value
1	5	30
2	10	40
3	15	45
4	22	77
5	25	90

	OR			
7	Discuss Strassen's matrix multiplication? Derive its Time Complexity	3	2	2,3,12,13