SYNERGY INSTITUTE OF ENGINEERING AND TECHNOLOGY, DHENKANAL
Near NH-55, Banamali Prasad – 759001

Assignment-I[CO1]

Full Marks-40 **Duration-Within 1 Week from Notification**

Name- **Registration No-**

Subject with Code: Design And Analysis of Algorithms (CSPC2006)
Year & Semester: 2nd & 4th

Course & Branch: B. Tech & CSE

Course Outcome	Total Marks	Marks Secured	Signature of Evaluator
CO1	40		

Section-A
Answer All Questions

1. What are Time Complexity and Space Complexity of an algorithm? [2 marks][L2]
2. How Substitution method works for solving recurrence? [2 marks][L2]
3. What are the conditions for which Master Method is not applicable? [2 marks][L2]
4. What is recurrence? What are the methods to solve a recurrence? [2 marks][L2]

Section-B
Answer All Questions

1. Write a recursive and non-recursive algorithm for Binary Search and explain why it is more efficient than Linear Search. [6 marks][L2]
2. Solve the following recurrence using Recursion Tree Method. [6 marks][L3]
   a) $T(n)= 2T(n/2)+1$
   b) $T(n)=3T(n/4)+cn^2$

Section-C
Answer All Questions

1. Explain various Asymptotic Notations that describes the running time of an algorithm. . [10 marks][L2]
2. Explain Master's Method and solve the following recurrence using Master Method. [10 marks][L3]
   a) $T(n)=2T(n/4)+\sqrt{n}$
   b) $T(n)=2T(n/2)+n^3$

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Assignment-2[CO2]

Full Marks-40 **Duration-Within 1 Week from Notification**

Name- **Registration No-**

Subject with Code: **Design And Analysis of Algorithms (CSPC2006)** **Course & Branch**: B. Tech CSE

Year & Semester: 2nd, 4th

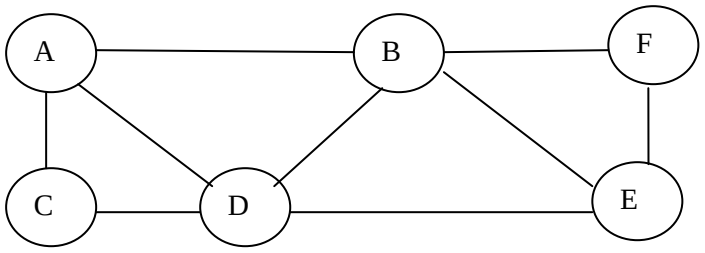
Course Outcome	Total Marks	Marks Secured	Signature of Evaluator
CO2	40		

Section-A
Answer All Questions

1. What is Disjoint Set? What are its applications? [2 marks][L2]
2. What is a Red-Black Tree? What are its properties? [2 marks][L2]
3. What is Divide and Conquer Paradigm for problem solving? [2 marks][L2]
4. What is AVL Tree? [2 marks][L2]

Section-B
Answer All Questions

1. Write an algorithm for Selection Sort and analyze its Time Complexity. [6 marks][L2]
2. Write an algorithm for BFS and apply BFS on given Graph. [6 marks][L3]



Section-C
Answer All Questions

1. What is Heap Data Structure? Write a procedure for MAX-HEAPIFY and apply Heap Sort on array A=<5,3,17,10,84,19,6,22> [10 marks][L3]
2. Write an algorithm for Quick Sort. Analyze its Time Complexity. Apply Quick Sort on array A=< 5,3,17,10,84,19,6,22> [10 marks][L3]

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Assignment-3[CO3]

Full Marks-40 **Duration-Within 1 Week from Notification**

Name- **Registration No-**

Subject with Code: **Design And Analysis of Algorithms (CSPC2006)** **Course & Branch**: B. Tech CSE

Year & Semester: 2nd. 4th

Course Outcome	Total Marks	Marks Secured	Signature of Evaluator
CO2	40		

Section-A
Answer All Questions

1. What is the advantage of Variable Length Coding over Fixed Length Coding? [2 marks][L2]
2. Define Knapsack Problem. How to solve it? [2 marks][L2]
3. What is Dynamic Programming? [2 marks][L2]
4. What is Network Flow Problem and what are its properties? [2 marks][L2]

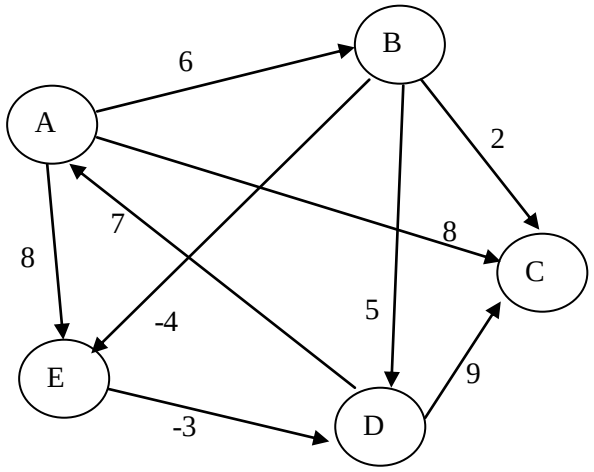
Section-B
Answer All Questions

1. What is LCS problem? Find LCS of <1,0,0,1,0,1,0,1> and <0,1,0,1,1,0,1,1,0> [6 marks][L3]
2. What is MST (Minimum Spanning Tree)? Write prim's algorithm to find MST of an undirected graph. [6 marks][L2]

Section-C
Answer All Questions

1. What is Matrix Chain Multiplication Problem? Find optimal parenthesization of a matrix chain product whose sequence of dimension is <10,5,4,8,6,10,8> [10 marks][L3]

2. Write Floyd-Warshall algorithm to find All Pair Shortest Path and solve the following graph. [10 marks][L3]



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Assignment-4[CO4]

Full Marks-40 **Duration-Within 1 Week from Notification**

Name- **Registration No-**

Subject with Code: **Design And Analysis of Algorithms (CSPC2006)** **Course & Branch**: B. Tech CSE

Year & Semester: 2^{nd}. 4^{th}

Course Outcome	Total Marks	Marks Secured	Signature of Evaluator
CO4	40		

Section-A
Answer All Questions

1. Differentiate between FIFO and LIFO Branch & Bound. [2 marks][L2]
2. Define Vertex Cover problem. [2 marks][L2]
3. What is the need of Approximation Algorithm? [2 marks][L2]
4. What is n-Queen's problem? [2 marks][L2]

Section-B
Answer All Questions

1. Write Robin-Karp String matching algorithm. [6 marks][L2]
2. Define the class P, NP, NPC and NP-hard problems. [6 marks][L2]

Section-C
Answer All Questions

1. What is Subset-Sum problem? Let w= {5,10,12,13,15,18} and m=30. Find a possible subset of w that sum to m. Draw the portion of state space tree that is generated. [10 marks][L3]

2. Write short notes on [10 marks][L2]
   a) Branch & Bound
   b) Backtracking