

# MODEL PAPERS

**B.TECH II YEAR – II SEM (R18)  
(2019-20)**



**DEPARTMENT OF  
COMPUTER SCIENCE AND ENGINEERING**

**MALLA REDDY COLLEGE OF ENGINEERING &  
TECHNOLOGY**

**(Autonomous Institution – UGC, Govt. of India)**

Recognized under 2(f) and 12 (B) of UGC ACT 1956

(Affiliated to JNTUH, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)  
Maisammaguda, Dhulapally (Post Via. Hakimpet), Secunderabad – 500100, Telangana State, India

Code No: xxxxxx

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****DESIGN AND ANALYSIS OF ALGORITHMS****II B. Tech II Semester Model Paper-I****(CSE& IT)**

<b>Roll No</b>									
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**Time: 3 hours****Max. Marks: 70****Note:**

Question paper Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

**SECTION – I**

1. Define time and space complexity. Explain with examples. [14M]

**(OR)**2. For  $T(n)=7T(n/2)+18n^2$  Solve the recurrence relation and find the time complexity. [14M]**SECTION – II**

3. Explain AND/OR graphs [14M]

**(OR)**

4. How 8-Queen's problem can be solved using back tracking and explain with an example. [14M]

**SECTION – III**5. Explain General method of Greedy method. Find the greedy solution for following job sequencing with deadlines problem  $n = 7$ ,  $(p_1, p_2, p_3, p_4, p_5, p_6, p_7) = (3, 5, 20, 18, 1, 6, 30)$ ,  $(d_1, d_2, d_3, d_4, \dots, d_7) = (1, 3, 4, 3, 2, 1, 2)$  [14M]**(OR)**

6. a) A motorist wishing to ride from city A to B. Formulate greedy based algorithms to generate shortest path and explain with an example graph. [7M]

b) What is the solution generated by function Job Sequencing algorithm when  $n=6$   $(P_1 \dots p_6) = (3, 5, 20, 18, 1, 6)$ , and  $(d_1 \dots d_6) = (1, 3, 4, 3, 2, 1)$ . [7M]**SECTION – IV**

7. Solve a travelling sales person problem using dynamic programming [14M]

**(OR)**

8 Write a function to compute lengths of shortest paths between all pairs of nodes for the given adjacency matrix. [14M]

$$\begin{pmatrix} 0 & 6 & 13 \\ 8 & 0 & 4 \\ 5 & \infty & 0 \end{pmatrix}$$

**SECTION – V**

9. Discuss Draw the portion of state space tree generated by FIFOBB for the following instance of 0/1 knapsack  $n= 5$ ,  $M=12$ ,  $(p_1, \dots, p_5) = (10,15,6,8,4)$   $(w_1, \dots, w_5)=(4,6,3,4,2)$ [14M]

**(OR)**

10. (a) Write and explain the Cooks theorem. [7M]

(b) What is non deterministic algorithm explain. [7M]

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Code No: XXXXXX

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****II B.Tech II Semester Model Paper-II****Design and analysis of Algorithms****(CSE & IT)**

<b>Roll No</b>									
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**Time: 3 hours****Max. Marks: 70**

**Note:** Question paper Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

**SECTION – I**

1. Illustrate Merge sort algorithm and discuss its time complexity.[14M]

**(OR)**

2. Explain Strassen's matrix multiplication and its time complexity [14M]

**SECTION – II**

3. Discuss union and find algorithms in detail with an example. [14M]

**(OR)**

4. a) Explain Prim's algorithm for minimal spanning tree with an example.[7M]  
b) Write in detail about Hamiltonian cycles. Give example to it.[7M]

**SECTION – III**

5. Write a greedy algorithm for sequencing unit time jobs with dead lines and profits. [14M]

**(OR)**

6. Derive time complexity of job sequencing with deadlines .Obtain the optimal solution when  $n=5$ ,  $(p_1, p_2, \dots)=(20, 15, 10, 5, 1)$  and  $(d_1, d_2, \dots)=(2, 2, 1, 3, 3)$ .[14M]

**SECTION – IV**

7. Explain the chained matrix multiplication with suitable example.[14M]

**(OR)**

8. Describe Travelling Salesperson Problem (TSP) using Dynamic Programming.[14M]

**SECTION – V**

9. Discuss in detail about the class P, NP, NP-hard and NP-complete problems. Give examples for each class.[14M]

(OR)

10. Describe Travelling Salesperson Problem (TSP) using Branch and Bound.[14M]

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Code No: xxxxxx

R18

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

**(Autonomous Institution – UGC, Govt. of India)**

**II B.Tech II Semester Model Paper-III**

**Design and analysis of Algorithms**

**(CSE & IT)**

<b>Roll No</b>									
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**Time: 3 hours**

**Max. Marks: 70**

**Note:** Question paper Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

**SECTION – I**

1. Simulate Quick sort algorithm for the following example 25,36,12,4,5,16,58,54,24,16,9,65,78 [14M]

(OR)

2. a) Write an algorithm for linear search and analyze the algorithm for its time complexity. [7M]  
b) What is pseudo-code? Explain with an example. [7M]

**SECTION – II**

3. Explain about bi-connected components in detail. [14M]

(OR)

4. Give the solution to the m-coloring of a graph using backtracking. [14M]

**SECTION – III**

5. Define Greedy knapsack. Find the optimal solution of the Knapsack instance  $n=7$ ,  $M=15$ ,  $(p_1, p_2, \dots, p_7) = (10, 5, 15, 7, 6, 18, 3)$  and  $(w_1, w_2, \dots, w_7) = (2, 3, 5, 7, 1, 4, 1)$ . [14M]

(OR)

6. Write about 0/1 knapsack problem with an example. [14M]

**SECTION – IV**

7. Let  $n=4$  and  $(a_1, a_2, a_3, a_4)$  Construct optimal binary search for  $(a_1, a_2, a_3, a_4) = (\text{do}, \text{if}, \text{int}, \text{while})$ ,  $p(1 : 4) = (3, 3, 1, 1)$   $q(0 : 4) = (2, 3, 1, 1, 1)$  [14M]

(OR)

8. Explain how solution will be provided for all pairs shortest path problem using dynamic programming. [14M]

**SECTION – V**

9. a) Explain non-deterministic algorithm with an example.[7M]  
b) Explain Satisfiability problem.[7M]

(OR)

10. Draw the portion of state space tree generated by LCBB for the following instance of 0/1 knapsack  $n=5$ ,  $M=12$ ,  $(p_1, \dots, p_5) = (10, 15, 6, 8, 4)$   $(w_1, \dots, w_5) = (4, 6, 3, 4, 2)$ . [14M]

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**R18**

Code No: xxxxxx

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**II B.Tech II Semester Model Paper-IV**

**Design and analysis of Algorithms**

(CSE & IT)

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**Time: 3 hours**

**Max. Marks: 70**

**Note:** Question paper Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

**SECTION – I**

1. a) Explain the process of designing an algorithm. Give characteristics of an algorithm. [7M]  
b) Explain asymptotic notations. [7M]

(OR)

2. a) Give the general procedure of divide and conquer method.[7M]  
b) Write about quick sort method with example.[7M]

**SECTION – II**

3. a) Explain about Disjoint set operations.[7M]  
b) Write short notes on spanning trees. [7M].

(OR)

4. What is an articulation point? How to find articulation point for a given graph. [14M]

**SECTION – III**

5. Define Greedy knapsack. Find the optimal solution of the Knapsack instance  $n=7, M=20, (p_1, p_2, \dots, p_7) = (8,5,6,7,6,12,3)$  and  $(w_1, w_2, \dots, w_7) = (2,10,8,7,6,4,11)$ . [14M]

(OR)

6. Give the optimal solution for 0/1 knapsack problem using greedy method.  
 $(p_1, p_2, p_3, p_4) = (11, 21, 31, 33), (w_1, w_2, w_3, w_4) = (2, 11, 22, 15), M=40, n=4$ . [14M]

**SECTION – IV**

7. Let  $n=4$  and  $(a_1, a_2, a_3, a_4)$  Construct optimal binary search for  $(a_1, a_2, a_3, a_4) = (\text{cout, float, if, while})$ ,  $p(1 : 4) = (1/20, 1/5, 1/10, 1/20)$   $q(0 : 4) = (1/5, 1/10, 1/5, 1/20, 1/20)$  [14M]

(OR)

8. Explain optimal binary search tree with an example. [14M]



**SECTION – V**

9. What is state space tree? What are the different ways of searching an answer node in an state space tree explain with example. [14M]

(OR)

10. a) Write non-deterministic algorithm for knapsack problem?[7M]

b) Difference between NP-hard and NP-complete problems[7M]

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Code No: R17A0508

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**II B.Tech II Semester Regular Examinations, April/May 2019****Design and Analysis of Algorithms****(CSE & IT)**

<b>Roll No</b>										
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**Time: 3 hours****Max. Marks: 70**

**Note:** This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing **ONE** Question from each SECTION and each Question carries 14 marks.

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**SECTION-I**

- 1 Explain about Psuedo code for expressing algorithms [7M]  
Define an algorithm and write the characteristics of algorithm. [7M]

OR

- 2 Describe performance analysis, space complexity and time complexity. [7M]

Differentiate between probabilistic analysis and amortized analysis. [7M]

**SECTION-II**

- 3 Illustrate the general method of divide and conquer technique. [7M]  
Write an algorithm for Binary search and discuss its complexity. [7M]

OR

- 4 a. Explain knapsack problem in Greedy method [7M]  
b. Explain algorithm for Job sequencing with deadlines [7M]

**SECTION-III**

- 5 Explain Matrix chain multiplication in dynamic programming. [14M]

OR

- 6 Explain 0/1 knapsack problem dynamic programming. [14M]

**SECTION-IV**

- 7 a. Write a depth first search algorithm for graph traversal. [7M]  
b. Discuss about AND / OR graphs and game trees [7M]

OR

- 8 a. Define graph coloring and write an algorithm to find Hamiltonian cycles. [7M]  
b. Compare and contrast between connected components and bi connected components. [7M]

**SECTION-V**

- 9 a. Explain FIFO Branch and Bound solution. [7M]  
b. Differentiate between NP - Hard and NPComplete classes. [7M]

OR

- 10 a. Explain 0/1 knapsack problem in Branch and Bound technique. [7M]  
b. Discuss about general method of branch and bound technique. [7M]

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Code No: R15A0508

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Regular/Supplementary Examinations, April/May 2018

Design and analysis of Algorithms

(CSE &amp; IT)

Roll No									
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**Time: 3 hours****Max. Marks: 75****Note:** This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

**PART – A****(25 Marks)**

1. (a) General strategy of divide and conquer [2M]
- (b) What are the performance analysis techniques of an algorithm? [3M]
- (c) What is union and find? [2M]
- (d) Explain bi connected components. [3M]
- (e) What is job sequencing with deadlines? [2M]
- (f) What is greedy method? [3M]
- (g) What is a graph coloring problem? [2M]
- (h) What is general backtracking method? [3M]
- (i) What is the difference between NP hard and NP Complete problem? [2M]
- (j) List the advantages of dynamic programming. [3M]

**PART – B****(50 Marks)****SECTION – I**

2. Explain in detail about asymptotic notations. [10M]

(OR)

3. Explain Merge sort technique. Give the time complexity of merge sort. [10M]

**SECTION – II**

4. Explain the following graph traversal
- (c) Depth First search [5M]
- (d) Breath First search. [5M]

(OR)

5. Write short notes on
- a) Game trees [5M]
- b) AND/OR graphs [5M]

**SECTION – III**

6. How do you construct a minimum Spanning tree using kruskals algorithm explain? List any two applications. [10M]

(OR)

7. State dynamic programming. Explain with one application. [10M]

**SECTION – IV**

8. Explain the Travelling salesmen problem using Branch and bound technique. [10M]

(OR)

9. Give the solution to the 8 queen's problems using backtracking. [10M]

**SECTION – V**

10. Discuss in detail about the class P, NP, NP-hard and NP-complete problems. Give examples for each class. [10M]

(OR)

11. (a) Write and explain the Cooks theorem. [5M]

(b) What is non deterministic algorithm explain. [5M]

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