

11-5-19
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B.E / B.Tech (FT) END SEMESTER EXAMINATIONS – APRIL / MAY 2019

INFORMATION TECHNOLOGY

Fourth Semester

IT 8401 ALGORITHMICS

(Regulation 2012)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What is an algorithm? What are the characteristics of an algorithm?
2. Define Worst, Best and average case analysis of algorithms.
3. Define Big-Oh Notation.
4. State Master's theorem.
5. What is the difference between greedy and dynamic programming approach?
6. What are the elements of dynamic programming?
7. Write an algorithm for Naïve String matching algorithm?
8. What is primal and dual? How do you convert from primal to dual form?
9. What is meant by reducibility?
10. What is a NP-Complete problem?



Part – B (5 x 16 = 80 marks)
(Question No.11 is Compulsory)

11. Explain Merge sort with a set of numbers {1,2,5,2,12,4,18,22,26,30} . Derive the best, average and worst case analysis of merge sort.
12. a) Write an algorithm for Towers of Hanoi using recursive functions. Analyse it using recurrence equations using substitution method.
(OR)
b) Write an algorithm for Linear Search. Derive the best, average and worst case analysis.
13. a) Write an algorithm for chained matrix multiplication. If the given sequence is {4, 10, 3, 12, 20, and 7}. The matrices have size 4 x 10, 10 x 3, 3 x 12, 12 x 20, 20 x 7. Compute the optimal multiplication using chained matrix multiplication method.
(OR)
b) Write a procedure for Huffman code. Derive the Huffman code for the following set of symbols.

Value	A	B	C	D	E	F
Frequen cy	5	25	7	15	4	12

14. a) Solve the following linear programming problem using simplex procedure:

Maximize $P = -2x + 5y$, subject to:

$$100 < x < 200$$

$$80 < y < 170$$

$$y > -x + 200$$

(OR)

- b) Write an algorithm for Knuth-Morris-Pratt algorithm? Find the word sentence in this sentence – “This is a double sentence” using KMP algorithm.

15. a) What is a randomized algorithm? Solve the hiring problem using randomized approach.

(OR)

- b) What is an approximation algorithm? Explain the approximation algorithms for Traveling Salesman problem.

