KUMARAGURU
college of technology
character is life

B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Third Semester

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

U18AII3202: ALGORITHMS AND OPTIMIZATION OF PROGRAMS

COURSE OUTCOMES

CO1: Understand techniques for effective problem solving in computing

CO2: Design different paradigms of problem solving to illustrate clever and efficient ways to solve a given problem.

CO3: Identify and apply for rigorously proving correctness of the algorithm for a variety of problems.

CO4: Implement to show the efficiency of the algorithm over the naive techniques

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

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1.	What do you mean by Time and Space complexity and how they are associated in terms of tradeoff ?.Give an example	CO1	[K1]
2.	List out few advantages of algorithms	CO2	[K1]
3.	Analyze the important aspects of Master theorem along with its application	CO3	[K4]
4.	Compare binary search with a linear search	CO4	[K3]
5.	Differentiate quick sort and merge sort algorithms	CO3	[K4]
6.	Build an algorithm to implement brute force attack for generating a 4 digit ATM pin	CO2	[K3]
7.	Identify the differences between Prims and Kruskals algorithms	CO2	[K1]
8.	What is SSH hashing framework?	CO1	[K2]
9.	Compose Dijkstra's algorithm along with its advantages	CO4	[K6]
10.	Validate NP complete problem with an example	CO2	[K5]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Explain the process involved in using recurrence relations to analyze recursive algorithms with example.	8	CO2	[K2]
	b)	Build an algorithm to sort large set of numbers and highlight some of the advantages of using quick sort.	8	CO3	[K3]

12. a) Plan a method for completing maximum number of activities in given span of time and whose details are as follows | 16 | CO2 | [K6]

Given 10 activities along with their start and end time as

S = (A1 A2 A3 A4 A5 A6 A7 A8 A9 A10)

Si = (1,2,3,4,7,8,9,9,11,12)

fi = (3,5,4,7,10,9,11,13,12,14)

13. a) Make use of the following diagram to implement Travelling Salesman Problem and furnish the code to implement TSP | 16 | CO3 | [K3]
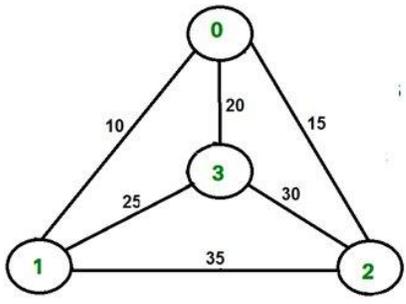
14. a) Identify the importance of linear probing in hashing and how it differs from quadratic probing | 8 | CO4 | [K4]

   b) Examine the importance of MD5 along with its advantages | 8 | CO1 | [K3]

15. a) Propose a program that resolves any real time problem and optimize the same script in which its time and space complexity is reduced linearly or exponentially. | 8 | CO2 | [K2]

   b) Construct a model and implement any optimized algorithm that helps to automate a process like sorting or gaining maximum profit or performing maximum events in a short time | 8 | CO3 | [K6]

16. a) Identify the important characteristics of algorithm which needs to be followed in designing and narrate the consequences of avoiding finiteness | 8 | CO1 | [K3]

   b) Construct a traditional matrix multiplication algorithm and point out the problems in implementing Strassen's Matrix Multiplication | 8 | CO2 | [K6]

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