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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&ML)/ (Artificial Intelligence (AI) and Data Science/ (Artificial Intelligence)/ (Computer Engineering)/ (CSE)\(Cyber Security)/ (IOT)/Data Science/(Internet of Things and Cyber Security including Block Chain Technology) (Sem-4)

DESIGN & ANALYSIS OF ALGORITHMS

Subject Code : BTCS-403-18

M.Code : 77629

Date of Examination : 22-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

SECTION-A

1. Answer briefly :

- a) Describe Big 'O' notation used in algorithms.
- b) What is flow network?
- c) How is an algorithm's time efficiency measured?
- d) What is recursive call?
- e) What is Knapsack problem?
- f) What are the advantages of topological sorting?
- g) Define state space of the problem.
- h) What is best-case efficiency?
- i) What are dynamic trees?
- j) What is approximate solution?

SECTION-B

2. What do you mean by time complexity and space complexity of an algorithm?
3. Write the general procedure of dynamic programming.
4. What are heuristics? What are their characteristics?
5. What do you mean by Asymptotic Notations? Explain.
6. Find the longest common subsequence for the following two sequences using dynamic programming. Show the complete process.

X = 100101001

Y = 101001.

SECTION-C

7. What are NP- hard and NP-complete problems? Explain with example.
8. **Write a detailed note on the following :**
 - a) Substitution Method
 - b) Network Flow Algorithm.
9. Explain fractional knapsack problem with example.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.