Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (IT) (Sem.–4)

DESIGN & ANALYSIS OF ALGORITHMS

Subject Code : BTIT-403-18

M.Code : 77540

Date of Examination : 24-11-2023

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) What do you mean by the running time of an algorithm?

b) What is a recurrence relation?

c) What is the significance of upper and lower bounds?

d) Where the topological sort is useful?

e) What are the graph traversal techniques?

f) What is the minimal spanning tree? What are its advantages?

g) What are NP class problems?

h) What are the characteristics of the problems to be solvable via dynamic programming?

i) How will you measure input size of algorithms

j) Define Big oh (O) notation.

SECTION-B

2. Prove the equation $\lg(n!) = -(n \lg n)$. Also prove that $n! = (2^n)$ and $n! = o(n^n)$.

3. What are greedy algorithms? What are their characteristics? Explain any greedy algorithm with example.

4. What is NP Completeness? Is P = NP? Explain.

5. What are the steps in the dynamic programming approach of problem solving?

6. What are heuristics? What are their characteristics? Explain.

SECTION-C

7. What is transitive closure? What is its importance? Write an algorithm to find the transitive closure.

8. Consider three items along with their respective weights and values as:

$$I = <il, i2, i3> , w = <5,4,3> , v=<6,5,4>$$

The knapsack has the maximum capacity W = 7, you have to pack this knapsack using branch and bound technique so as to give the maximum possible value while considering all constraints.

9. What is the relationship among P, NP and NP complete problems? Show with the help of a diagram.

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