Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

Total No. of Questions : 09

M.Sc.(Computer Science) (Sem.–4)
DESIGN & ANALYSIS OF ALGORITHMS
Subject Code : MSC-401
M.Code : 72419
Date of Examination : 05-07-22

Time : 3 Hrs.   Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**
1. **SECTIONS-A, B, C & D contains TWO questions each, carrying TEN marks each and students have to attempt any ONE question from each SECTION.**
2. **SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.**
3. Use of non-programmable **scientific calculator** is allowed.

SECTION-A

1. Compare :

    (i) Time Vs Space Complexity   (ii) Polynomial Vs exponential running Time

    (iii) Upper Vs Lower Bound   (iv) Shortest path Vs Minimal Spanning tree

2. What is the condition for implementation of Binary search algorithm? Explain in detail the implementation of binary search with an illustrative example.

SECTION-B

3. Write and explain the algorithm to find APSP problem. Use the following graph to calculate the All paths:
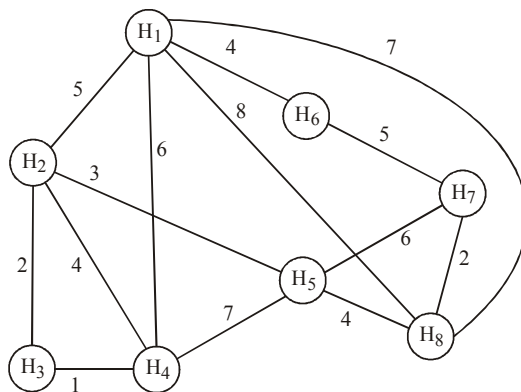
4. Compare and contrast various programming Paradigms such as divide-and -conquer, Dynamic, Greedy.

SECTION-C

5. Describe binary search tree with three traversal patterns? Give suitable example with neat diagram for all three traversal of binary search tree.

6. Explain the method to solve the 4-queeens problem using an illustrative example of backtracking.

SECTION-D

7. What is fast Fourier transform formula? How does the Fast Fourier transform work? Explain the working of Fast Fourier transform algorithm.

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

SECTION-E

9. a) What are the types of efficiencies?

   b) What are the fundamental steps in problem solving?

   c) What is meant by NP hard and NP-complete problems?

   d) What is 0/1 Knapsack problem?

   e) Define principle of optimality?

   f) What are the two classes of non-polynomial algorithms?

   g) What are the features of dynamic programming?

   h) What are the differences between Greedy and Dynamic programming?

   i) What is the working principle of Quicksort?

   j) What is the time complexity of the algorithm for finding all-pairs-shortest-path problem?

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.