FACULTY OF INFORMATICS
MCA 2 Year Course - II Semester (Supply) Examination, April 2022

Subject: Design and Analysis of Algorithms

Time: 3 Hours   **Max. Marks: 70**
(Missing data, if any, may be suitably assumed)

Note: Answer any five questions from the following.
All questions carry equal marks.

1. (a) Explain the big-o-notation and its significance.
   (b) Write an algorithm to add an element to a circular queue.

2. (a) What are randomized algorithms? Explain with the help of an example.
   (b) What is a priority queue? Explain with the help of an example.

3. (a) What is the solution generated by the function Job Schedule(JS), when
      n=7(p1,p2,…p7)=(3,5,20,18,1,6,30) and (d1,d2,…d7)=(1,3,4,3,2,1,2)?
   (b) Write an algorithm for merge sort and analyze the algorithm for average time
      complexity.

4. (a) Write greedy algorithm for knapsack problem.
   (b) What is a Minimum Cost Spanning tree? Explain Kruskal's Minimum cost
      spanning tree algorithm with suitable example.

5. (a) What is Dynamic programming? Explain with an example.
   (b) State and explain the working of BFS algorithm with suitable example.

6. (a) Explain the all pair shortest path problem with an algorithm
   (b) Construct an Optimal Binary Search tree for identifiers
      (a1,a2,a3,a4)=(do,if,int,while) with p(1:4)=(3,3,1,1) and Q(0:4)=(2,3,1,1,1).

7. (a) Discuss the technique of backtracking.
   (b) Write back tracking algorithm for 8 queen problem.

8. (a) Explain the branch-and-bound method with the help of an example.
   (b) What is an Hamiltonian cycle? Give an example.

9. (a) Differentiate between deterministic and non-deterministic algorithms.
   (b) State and prove Cook's Theorem.

10. (a) Explain the clique decision problem.
    (b) What is NP complete problem? Explain steps to prove that problem is NP-
       complete.

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