C 23321 **(Pages : 2)** **Name.....**

Reg. No.....

SECOND SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, APRIL 2022

(CBCSS)

Computer Science

CSS 2C 06—DESIGN AND ANALYSIS OF ALGORITHMS

(2019 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

General Instructions

1. In cases where choices are provided, students can attend **all** questions in each section.
2. The minimum number of questions to be attended from the Section/Part shall remain the same.
3. The instruction if any, to attend a minimum number of questions from each sub section/sub part/ sub division may be ignored.
4. There will be an overall ceiling for each Section/Part that is equivalent to the maximum weightage of the Section/Part.

Section A

Answer any **four** *questions.*
Each question carries 2 *weightage.*

1. Explain the general method of Branch-and-bound algorithms.
2. Justify that Merge sort is a Divide and Conquer algorithm.
3. Compare RAM and PRAM models.
4. Define and compare Big Oh and Little Oh.
5. Prove that $f(n) = 3n + 2 - \Theta(n)$.
6. Define P, NP, NP Hard and NP complete problems.
7. Explain speed up and Scalability in parallel algorithms.

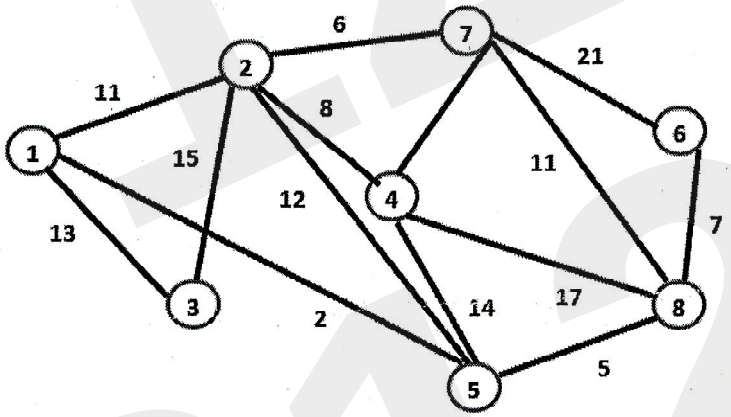
(4 × 2 = 8 weightage)

Turn over

Section B

Answer any **four** *questions.*
Each question carries 3 *weightage.*

8. For the following graph, show the stages of Kruskal's algorithm to find the minimum cost spanning tree :



9. Let w = (1, 7, 10, 15, 17, 20, 18, 25) and m = 35. Demonstrate backtracking by finding subsets of w that sum to m.
10. What is a combinatorial problem ? Give one example.
11. Demonstrate cost estimation based on key operations with suitable example.
12. Demonstrate substitution method for solving recurrences with suitable example.
13. Explain the concept of reductions in NP completeness.
14. Demonstrate the advantage of parallel merging algorithm.

(4 × 3 = 12 weightage)

Section C

Answer any **two** *questions.*
Each question carries 5 *weightage.*

15. Demonstrate Dynamic programming solution for Longest common subsequence.
16. Analyse Merge sort algorithm.
17. Show that Hamiltonian Cycle problem is NP complete.
18. Explain with example, parallel prefix computation.

(2 × 5 = 10 weightage)