Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd.u/s 3of UGC Act 1956, Category A by MHRD [now MoE]
Re-accredited with an A++ Grade by NAAC CGPA 3.65/4, Category I by UGC
Coimbatore-641043, Tamil Nadu, India

Continuous Internal Assessment II – April 2025
II Semester

Class : I UG **Time : 2 hours**
Major : Computer Science **Max. Marks : 60**

23BCSC04 Discrete Structures

Course Outcomes:

1. Understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving.
2. Understand the basics of combinatorics, and be able to apply the methods from these subjects in problem solving.
3. Be able to use effectively algebraic techniques to analyse basic discrete structures and algorithms.
4. Understand asymptotic notation, its significance, and be able to use it to analyse asymptotic performance for some basic algorithmic examples.
5. Understand some basic properties of graphs and trees and related discrete structures, and be able to relate these to practical examples.

Part A **6 x 1= 6**

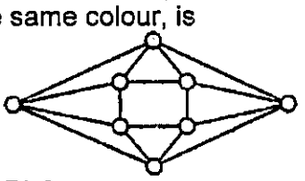
Choose the Correct Answer

1. The recurrence relation, T(1) = 2, T(n) = 3T(n/4)+n has the solution, T(n) equals to CO3K1
A) O(n) B) O(log n) C) O(n^3/4) D). O(n^3)

2. Solving the recurrence by the sum of the multiples of previous terms is called
A) Degree B) Linear C) Homogenous D) Coefficient CO3K2

3. Let G be a simple undirected planar graph on 10 vertices with 15 edges. If G is a connected graph, then the number of bounded faces in any embedding of G on the plane is equal to
A) 6 B) 5 C) 4 D) 3 CO4K1

4. The minimum number of colours required to colour the following graph, such that no two adjacent vertices are assigned the same colour, is CO4K2



A) 2 B) 5 C) 4 D) 3

5. In a tree, a node with an outdegree greater than or equal to one is considered an ____ node?
A) Outer B) Internal C) External D) Terminal CO5K1

6. The act of traversing a tree involves visiting all its _____? CO5K1
A) Nodes B) Edges C) Vertices D) Endpoints

Part B **3 x 6 = 18**

Answer ALL questions

Each answer should not exceed 400 words or two pages

7.a. Find the time complexity of the recurrence relation using substitution method
T(n) = 2T(n/2) + n if n > 1 and T(n) = 1 if n = 1. CO3K4

(or)

7.b. Describe the concept of connectivity in Graph Theory. CO4K3

8.a. Discuss the various Graph representations. CO4K4

(or)

8. b. Write notes on Graph Coloring. CO4K3

9.a. Define Well Formed Formula, the rules for well formed formula and give few examples for well formed formula and not well formed formula. CO5K2

(or)

9.b. Detail on the basic terminologies and properties of trees. CO5K3

Part C **3 x 12 = 36**

Answer ALL questions

Each answer should not exceed 800 words or four pages

10.a. Explain the basic terms and various Models in Graph Theory. CO4K2

(or)

10.b. Explain the concept of Graph Isomorphism with examples. CO4K2

11.a. Detail on the Euler and Hamiltonion Circuits with suitable examples. CO4K2

(or)

11.b. Explain the concept of Spanning Trees with example.
Explain Prim's and Kruskal's Algorithm with example. CO5K4

12.a. Describe the various logical equivalences. Explain Tautology with example. CO5K3

(or)

12. b. Give a detailed explanation on Inference Theory. CO5K3

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