

GRAPH THEORY AND COMBINATORICS (Common to CSE & ISE)

Written by Administrator

Sunday, 08 November 2009 06:35 -

Sub Code

:

06CS42

IA Marks

:

25

Hrs / Week

:

04

GRAPH THEORY AND COMBINATORICS (Common to CSE & ISE)

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Exam Hours

Total Hrs

Exam Marks

PART – A

UNIT 1:

1. Introduction to Graph Theory: Definitions and Examples, Subgraphs, Complements, and Graph Isomorphism, Vertex Degree, Euler Trails and Circuits

7 Hours

UNIT 2:

1. Introduction to Graph Theory *contd.*: Planar Graphs, Hamilton Paths and Cycles, Graph Colouring, and Chromatic Polynomials

6 Hours

UNIT 3:

1. Trees: Definitions, Properties, and Examples, Routed Trees, Trees and Sorting, Weighted Trees and Prefix Codes

6 Hours

UNIT 4:

1. Optimization and Matching: Dijkstra's Shortest Path Algorithm, Minimal Spanning Trees – The algorithms of Kruskal and Prim, Transport Networks – Max-flow, Min-cut Theorem, Matching Theory

7 Hours

PART – B

UNIT 5:

1. Fundamental Principles of Counting: The Rules of Sum and Product, Permutations, Combinations – The Binomial Theorem, Combinations with Repetition, The Catalan Numbers

6 Hours

UNIT 6:

1. The Principle of Inclusion and Exclusion: The Principle of Inclusion and Exclusion, Generalizations of the Principle, Derangements – Nothing is in its Right Place, Rook Polynomials

6 Hours

UNIT 7:

1. Generating Functions: Introductory Examples, Definition and Examples – Calculational Techniques, Partitions of Integers, The Exponential Generating Function, The Summation Operator

7 Hours

UNIT 8:

1. Recurrence Relations: First Order Linear Recurrence Relation, The Second Order Linear Homogeneous Recurrence Relation with Constant Coefficients, The Non-homogeneous Recurrence Relation, The Method of Generating Functions

7 Hours

Text Book

1. **Discrete and Combinatorial Mathematics**, Ralph P. Grimaldi, 5th Edition, PHI/Pearson Education, 2004.

(Chapter 11, Chapter 12.1 to 12.4, Chapter 13, Chapter 1, Chapter 8.1 to 8.4, Chapter 9 Chapter 10.1 to 10.4).

Reference Books

1. **Graph Theory and Combinatorics**, Dr. D.S. Chandrasekharaiah, Prism, 2005.
2. **Introduction to Graph Theory**, Chartrand Zhang, TMH, 2006.
3. **Introductory Combinatorics**, Richard A. Brualdi, 4th Edition, Pearson Prentice Hall, 2004.
4. **Graph Theory Modeling, Applications, and Algorithms**, Geir Agnarsson & Raymond Geenlaw, Pearson Prentice Hall, 2007.

Note

The Question paper consists of two parts A and B containing 4 questions each. The student is required to answer any 5 questions selecting at least two questions from each part.