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1 (SEM-6/FYUGP) CIT09

2026

**COMPUTER APPLICATION/
INFORMATION TECHNOLOGY**

Paper : CIT0600904

(Graph Theory)

Full Marks : 60

Time : 2½ hours

*The figures in the margin indicate
full marks for the questions.*

1. Answer the following questions: $1 \times 10 = 10$

- (a) What is a Path?
- (b) What is a Pendant Vertex?
- (c) Define Directed Graph.
- (d) Define degree in terms of a graph.
- (e) Define forest.
- (f) What is a simple graph?
- (g) Define Cycle in a graph.
- (h) Define Chromatic Number.
- (i) Define Orientable Graph.
- (j) Define Components in a graph.

2. Answer the following: **(any five)** $2 \times 5 = 10$

- (a) What is Breadth First Search Traversal?
- (b) Define isomorphism.
- (c) What is a bipartite graph?
- (d) Explain Euler Graph.
- (e) Explain the concept of Hamiltonian digraph.

(f) Describe Residual Graph.

(g) Explain the meaning and uses of Vertex coloring.

(h) What is a Binary Search Tree?

(i) State Brook's theorem.

3. Answer **any eight** of the following questions:
 $5 \times 8 = 40$

(a) Define Incidence Matrix, Adjacency Matrix, Adjacency List.

(b) Explain Kruskal's Minimum spanning Tree Algorithm along with examples.

(c) Explain in detail the concept and uses of Dijkstra's algorithm.

(d) Explain the Travelling Salesman Problem.

(e) Define cut set, cut vertices. Give examples.

(f) Explain Huffman Coding, Huffman Tree.

(g) Explain the key concepts and steps of Ford Fulkerson's algorithm.

(h) Define disjoint spanning tree, multiway search tree.

- (i) Define independent set, dominating set along with examples.
 - (j) Explain Fleuri's algorithm.
 - (k) Explain the key differences between Dijkstra's algorithm and Bellman Ford algorithm.
 - (l) Explain key concepts and applications of Markov chains.
 - (m) Explain bipartite matching, maximum bipartite matching.
 - (n) Explain the key differences between B Tree and B+ Tree.
 - (o) Define Multigraph, Homomorphism.
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