Bachelor of Science (Information Technology) Semester–V Examination

GRAPH THEORY

Paper–6

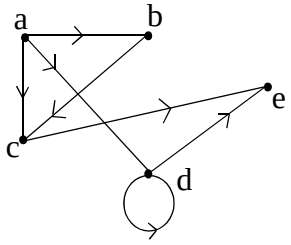
Time : Three Hours] [Maximum Marks : 50

Note :— (1) All questions are compulsory and carry equal marks.
(2) Draw neat and well labelled diagram wherever necessary.

EITHER

1. (A) Define the following :
   (i) Simple graph
   (ii) Multi graph
   (iii) Directed graph
   (iv) Adjacent graph
   (v) Isolated node. 5

   (B) What do you mean by adjacency matrix ? Give an adjacency matrix to represent the graph shown below :



5

OR

(C) Discuss different operations on graph with example. 5

(D) Explain self complementary graph with example. 5

EITHER

2. (A) Explain path and circuit giving suitable examples. Also, differentiate between them. 5

   (B) Prove that a simple graph with 'n' vertices must be connected if it has more than $\frac{(n-1)\cdot(n-2)}{2}$ edges. 5

OR

(C) Explain Dijkstra's shortest path algorithm. 5

(D) Write notes on :
   (i) Cut-Vertex.
   (ii) Vertex connectivity. 5

EITHER

3. (A) Explain rooted trees and binary trees the with help of proper diagram. 5

   (B) Prove-A graph with 'n' vertices is a tree if and only if it is circuit free. 5

OR

(C) Prove-A connected graph G with 'n' vertices and n-1 edges is a tree. 5

(D) Explain Kruskal's algorithm with an example. 5

EITHER

4. (A) Explain directed trees with an example. 5

(B) Discuss isomorphism of digraphs. 5

OR

(C) Write a note on polish notation. 5

(D) What is flow in graph ? Explain Maximal flow algorithm. 5

5. (A) What is isomorphic graph ? 2½

(B) Define :

(i) walk

(ii) trail

(iii) tour. 2½

(C) Define :

(i) Height of tree

(ii) Forest. 2½

(D) Define arborescence. 2½