Bachelor of Science (Information Technology) (I.T.) (Semester-V) (CBS) Examination

GRAPH THEORY

Paper—6

Time : Three Hours] [Maximum Marks : 50

N.B. :— (1) **All** questions are compulsory and carry equal marks.

(2) Assume suitable data wherever necessary.

(3) Draw neat and labelled diagram wherever necessary.

EITHER

1. (a) Explain adjacency matrix and incidence matrix with example. 5

(b) Explain self complementary graph with example. 5

OR

(c) Define graph and operations on graph. 5

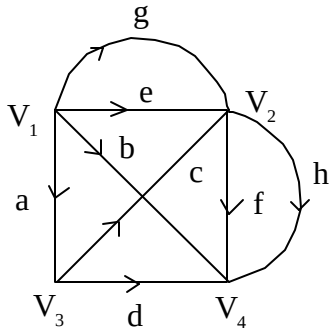
(d) Define subgraph and induced graph. Explain it with example. 5

EITHER

2. (a) Consider the graph in figure. Determine :

(i) Pendent vertices,

(ii) Pendent edges,



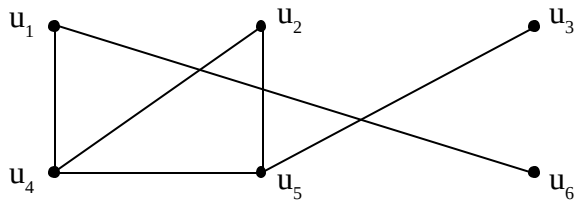
(iii) Write adjacency matrix for a graph. 5

(b) Define : (i) Path, (ii) Cycles and (iii) Connectivity. 5

OR

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

(d) Let G be a graph shown in figure. Find all simple paths from u_1 to u_3. 5



EITHER

3. (a) Prove the theorem : "A tree with n vertices for n – 1 edges". 5

(b) Define tree. Differentiate between tree and graph. 5

OR

(c) "A graph G is a tree if and only if it is minimally connected." Prove the above statement. 5

(d) Explain Kruskal's algorithm with example. 5

EITHER

4. (a) Explain directed trees with example. 5

(b) Explain isomorphism of diagraphs. 5

OR

(c) Write a note on Polish notation. 5

(d) Explain maximal flow algorithm with example. 5

5. Attempt **ALL** :

(a) What is isomorphic graph ? 2½

(b) What are incident edges ? 2½

(c) Define height of tree with example. 2½

(d) Define arborescence. 2½