**KNT/KW/16/5325**

**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.

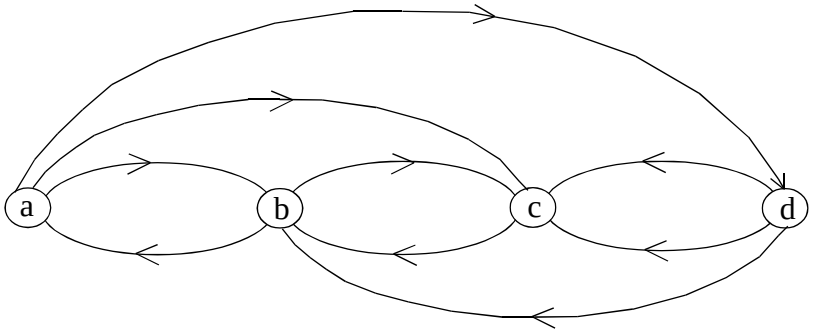
(2) Assume suitable data wherever necessary.

(3) Draw neat and labelled diagram wherever necessary.

**EITHER**

1. (a) Define Graph with example. What is degree of vertex ? 5

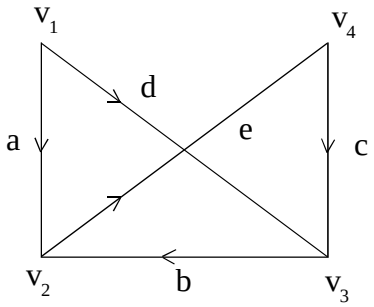
(b) Write the adjacency matrix of the following graph and find paths from vertex a to d. 5




**OR**

(c) What are the types of graphs ? 5

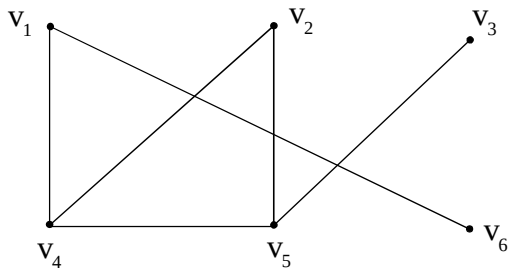
(d) Describe the graph shown in the following figure :




Find indegree, outdegree and total degree of node and graph. 5

**EITHER**

2. (a) Find the shortest path length from $v_1$ to $v_3$ in the graph shown with following figure : 5




(b) Define :

(i) Walk

(ii) Trail

(iii) Tour

(iv) Path, and

(v) Circuit. 5

**OR**

(c) Define connected graph with example. What is a strongly connected graph ? 5

(d) Explain Euler's path and circuit with example. 5

**EITHER**

3. (a) "A connected graph G with n vertices and n-1 edges is a tree". Prove it. 5

(b) Explain tree and spanning tree with example. 5

**OR**

(c) Prove that "A graph with n vertices is a tree if and only if it is circuit free and has n-1 edges". 5

(d) Explain binary tree and its any one method of traversing. 5

**EITHER**

4. (a) Prove that a graph G is a tree if and only if it is minimally connected. 5

(b) Explain maximal flow algorithm with example. 5

**OR**

(c) Explain Euler digraph with example. 5

(d) Explain isomorphism of digraph. 5

5. Attempt **all** :

(a) What is Union of graph ? 2½

(b) What is Pendent vertices ? 2½

(c) What is root of tree and forest ? 2½

(d) Define arborescence. 2½