B.C.A. (Part—I) Semester—II Examination

2ST5 : DISCRETE MATHEMATICS

Time : Three Hours] [Maximum Marks : 60

Note :— (1) All questions carry equal marks.

(2) All questions are compulsory.

1\. (a) Explain the following terms :

(i) Parallel edges

(ii) Loop

(iii) Pendent vertex. 6

(b) Define connected and disconnected graph and give the example of graph which gets disconnected on removing one edge. 6

OR

2\. (a) Define the following terms with suitable example :

(i) Bipartite graph

(ii) Null graph

(iii) Finite graph. 6

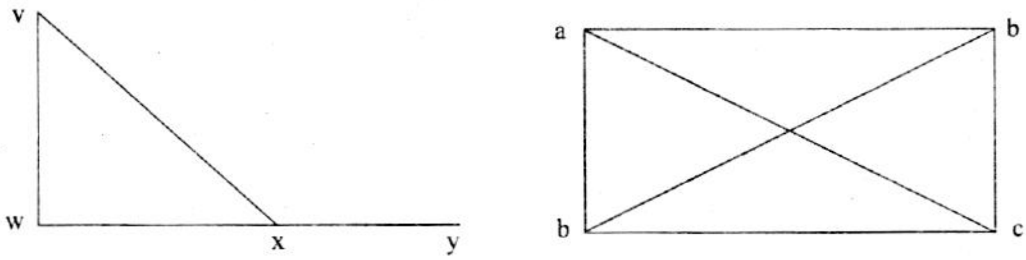
(b) Explain the following with example :

(i) Union

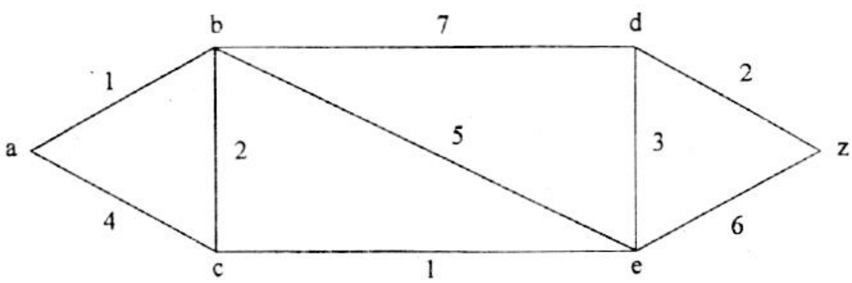
(ii) Intersection

(iii) Ring sum of two graphs. 6

3\. (a) Define edge connectivity and vertex connectivity of a graph. Also find the edge connectivity and vertex connectivity of following graph : 6



(b) By using Dijkstra's algorithm find shortest path from vertex a to z : 6



OR

4. (a) Prove that vertex connectivity never exceeds edge connectivity. 6

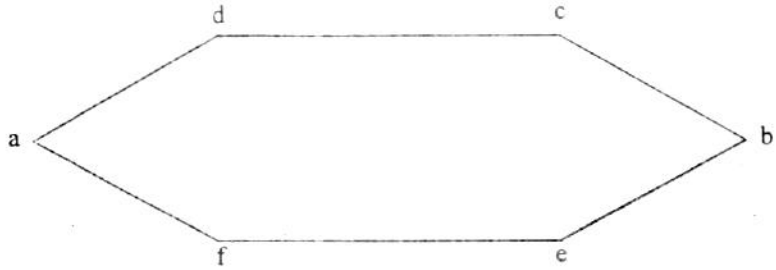
(b) Explain the following terms :

(i) Walk

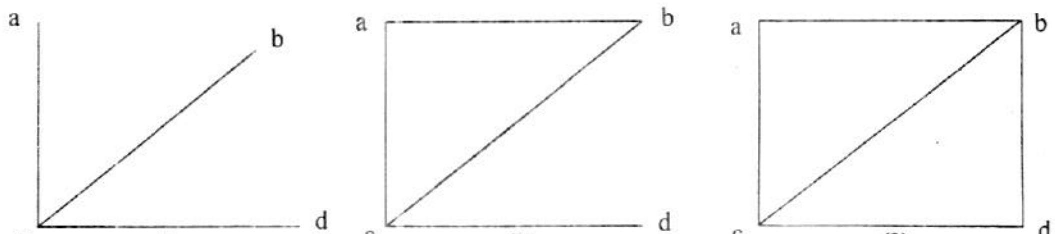
(ii) Path

(iii) Trail. 6

5. (a) Show that following graph is Eulerian and trace Eulerian circuit by using Fluery's algorithm : 6



(b) Find Hamiltonian path and cycle in following graph : 6

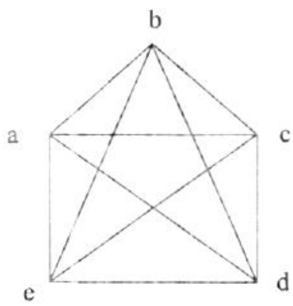


(1) (2) (3)

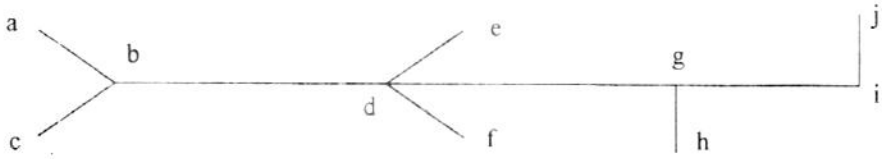
OR

6. (a) Write the characteristics of Eulerian graph in terms of degree. 6

(b) Show that following graph is Eulerian and find Eulerian circuit : 6



7. (a) Find the centre and radius of following tree : 6



(b) Prove that a binary tree of n vertices has $(n + 1)/2$ pendent vertices. 6

OR

8. (a) Define the following with suitable example :

   (i) Spanning Tree

   (ii) Fundamental Circuit

   (iii) Fundamental Cutset. 6

   (b) Define binary tree and prove that binary tree has odd number of vertices. 6

9. (a) Explain the different types of directed graphs with suitable example. 6

   (b) Define the following :

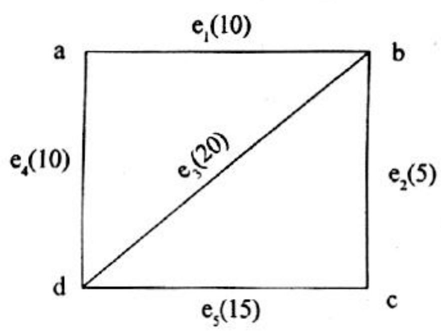
   (i) Arborescence

   (ii) Network

   (iii) Diagraph. 6

OR

10. (a) Find the shortest spanning tree by using Kruskal's algorithm : 6



   (b) Prove that every connected graph has at least one spanning tree. 6