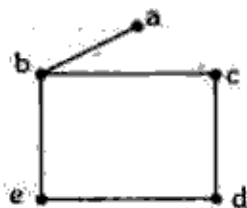
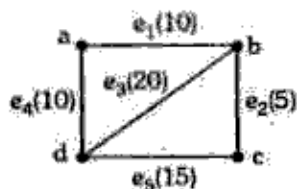


b) Find all spanning tree of the following graph. 6



UNIT - V

9. a) Find shortest spanning tree by using Krushkal's algorithm. 6



b) Prove that on arborescence is a tree in which every vertex other than the root has an in-degree of exactly one. 6

10. a) Draw the figure of a directed graph given formally as $V(G) = \{A, B, C, D\}$
 $E(G) = \{(A,D), (B,A), (B,A) (D,B), (B,C), (D,C), (B,B)\}$ Find indegree and outdegree of each of the vertex. 6

b) Define : i) Arborescene. 6
 ii) Spanning tree iii) Network.

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B.C.A.(Part-I) Second Semester

Discrete Mathematics - II

Paper- 2 ST 5

P. Pages : 4

Time : Three Hours

Max. Marks : 60

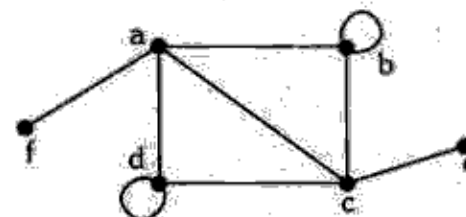
Note : 1. All questions carry equal marks.
 2. Attempt one question from each unit.

UNIT - I

1. a) Define : 6

- Directed graph.
 - Finite graph.
 - Null graph.
- with example of each.

b) Define adjacency matrix and find adjacency matrix from the following graph. Also write observation. 6



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1

P.T.O.

2. a) Show that maximum number of edges in a complete graph with n vertices are $\frac{n(n-1)}{2}$. **6**
- b) Verify Havel-Halimi theorem for degree sequence (2, 2, 4, 3, 1) **6**

UNIT - II

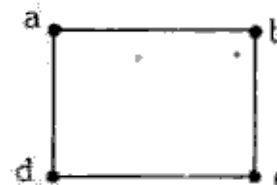
3. a) State Menger theorem in vertex form and edge form. **6**
- b) Show that vertex connectivity of any graph G can not exceed the edge connectivity of G . **6**
4. a) Prove that every cut set in a non-separable graph with more than two vertices contain at least 2 edges. **6**
- b) Prove that an edge e of a graph G is isthmus or bridge if and only if it does not belonging to any circuit. **6**

UNIT - III

5. a) Give an example of a graph which is **6**
- Eulerian and Hamiltonian.
 - Neither Hamiltonian nor Eulerian.
 - Eulerian but not Hamiltonian.
 - Hamiltonian but not Eulerian.

- b) Prove that an Euler graph G is arbitrary traceable from vertex V in G iff every circuit in G contains V . **6**

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



- b) Prove that a graph is Eulerian if and only if degree of each vertex is even. **6**

UNIT - IV

7. a) Define spanning tree and prove that every connected graph has atleast one spanning tree. **6**
- b) Prove that a graph is tree if and only if there exists only one path between every pair of vertices. **6**
8. a) Find the center and radius of the following tree. **6**

