

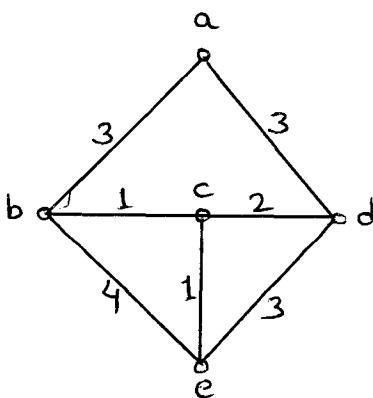


**SECTION-II**

- Q.5) a)** Explain the term “Isomorphic Graphs”. [05]
- b)** Construct an optimal tree for the weights 8, 9, 10, 11, 13, 15, 22. [05]  
Find the weight of the optimal tree.
- c)** Define the term. [04]
- i) Algebraic Systems
  - ii) Groups

- Q.6) a)** How many nodes are necessary to construct a graph with exactly 6 edges in which each node is of degree 2. [07]
- b)** Find  $k(G)$ ,  $\lambda(G)$  for  $K_{4,3}$  the complete bipartite graph. [06]

- Q.7) a)** Find the minimal spanning tree for the following graph by using Prim’s algorithm. [07]



- b)** For each of the following sets of weights construct an optimal binary prefix code. For each weight in the set give the corresponding code word. [06]
- i) 1, 2, 4, 5, 6, 9, 10, 12
  - ii) 10, 11, 14, 16, 18, 21
- Q.8) a)** Let  $G$  be a group; for a fixed element  $G$ , let  $G_x = \{ a \in G : ax = xa \}$ . [07]  
Show that  $G_x$  is a subgroup of  $G$  for all  $x \in G$ .
- b)** Let  $(A, *)$  be a group. Show that  $(A, *)$  is an Abelian group if and only if  $a^2 * b^2 = (a * b)^2$ . [06]

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