

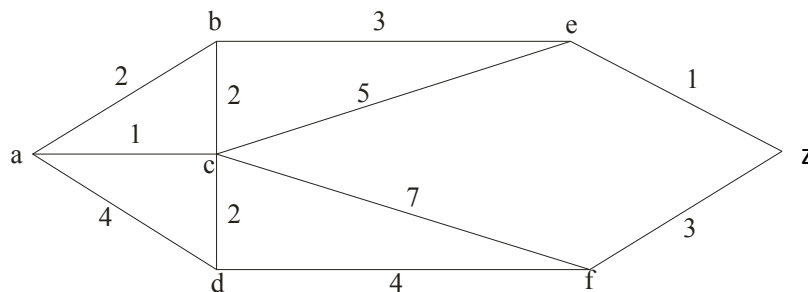
10. Define equivalent sets.

SECTION-B

11. Show that intersection of two partial order relations is a partial order relation. But union of two partial order relations need not be a partial order relation. Give suitable example.
12. The set C^* of all non-zero complex numbers form an infinite abelian group under the operation of multiplication of complex numbers.
13. a) How many people must you have to guarantee that at least 5 of them will have birthday on the same month.
- b) Find the number of positive integers from 1 to 500 which are divisible by at least one of 3, 5 and 7.
14. a) Prove that $(p \wedge q) \vee r = (p \vee r) \wedge (q \vee r)$
- b) Prove the validity of the following argument:
- If a man is bachelor, he is happy.
- If a man is happy, he dies young.
- Therefore bachelors die young.
15. Show that a graph G with n vertices and $(n - 1)$ edges and no circuit is connected.

SECTION C

16. Find the shortest path between a and z using Dijkstra's algorithm for the following graph:



17. a) Prove that every finite integral domain is a field.
- b) Simplify the Boolean expression $f(x, y, z) = (x \wedge y \wedge z) \vee (x \wedge y \wedge z)$. And find its conjunctive normal forms.

18. A function f is defined on the set of integers as follows:

$$f(x) = \begin{cases} 1+x & 1 \leq x < 2 \\ 2x-1 & 2 \leq x < 4 \\ 3x-10 & 4 \leq x < 6 \end{cases}$$

- a) Find the domain of the function.
- b) Find the range of the function.
- c) Find the value of $f(4)$.
- d) State whether f is one - one or many one function.

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