Very Imp

Graph And Trees.

Definition with example.

a) simple graph
b) complete graph
c) Bipartite graph
d) complete bipartite graph
e) Regular graph.
f) subgraph
g) Spanning subgraph
h) Induced subgraph
i) compliment of subgraph.
j) connected graph.

1) Problem from isomorphism (5 marks)
2) Konics berg bridge problem
3) Theorem: Tree with n vertex has n-1 edges.
4) Obtain optimal prefix code for
   i) ROAD IS GOOD
   ii) ENGINEERING.
5) Merge sort problem

Relation And Function

Relation

▷ The number of relation that contain a pair
no of relation from $A \to B$.

Functions:

2) Let a $f(x) = x^2 + 1$ determine images

$A_1 = \{2, 3\}$ $A_2 = \{-2, 0, 3\}$ $A_3 = \{0, 1\}$ $A_4 = [-6, 3]$

3) $$f(x) = \begin{cases} 3x - 5 & \text{for } x > 0 \\ -3x + 1 & \text{for } x \leq 0 \end{cases}$$

4) Find how many functions from $A \to B$ and $B \to A$
how many are one to one and how many are onto.

5) Pigeon hole problem → ABC triangle.
→ Dictionary problem.

Composition of Function.

6) $f(x) = x - 1$
$g(x) = 3x$
$$h(x) = \begin{cases} 0 & \text{if } x \text{ is even} \\ 1 & \text{if } x \text{ is odd.} \end{cases}$$

determine fogh ——— — — —

Invertible

7) Theorem: A function $f: A \to B$ $g: B \to C$ $g \circ f$ $(A \to C)$ is invertible $(gof)^{-1} = f^{-1} \circ g^{-1}$

8) $f(x) = 2x^3 - 1$

$g(y) = \left\{ \frac{1}{2}(y+1) \right\}^{1/3}$

prove that f & g are inverse of each other.

Relations :-

9) $(x_1, y_1) R (x_2, y_2)$ $x_1 + y_1 = x_2 + y_2$ prove that equivalence

9) Partial Order.

10) A divides B prove that partial order Hasse diagram.

11) Upper bound, lower bound, greatest lower bound, least upper bound, maximal, minimal (what is given in notes that question).