

- Instruction: 1) All questions are compulsory.
2) Each question carry equal marks.

Q 1) Solve the following (any 4)

[20]

- Arrange the numbers 6, 7, 4, 5, 3 in ascending order using Bubble sorting algorithm.
- Define the terms
 - Relation
 - Cycle
 - Boolean product of two matrices
 - Symmetric closure
 - simple path
- Solve the recurrence relation $a_n = 8a_{n-1} + 10^{n+1}$, with $a_1 = 9$, using generating function.
- Write a note on Tower of Hanoi.
- Let $A = \{1, 2, 3, 4, 5\}$. Using Warshall's algorithm find the transitive closure of R whose matrix is given by

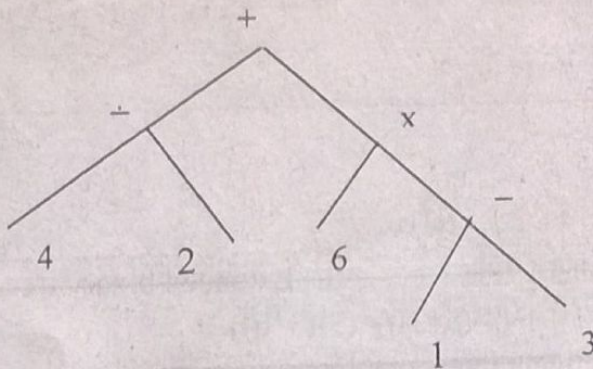
$$M_R = \begin{pmatrix} 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ 1 & 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 & 1 \end{pmatrix}$$

- Let a relation R defined on Z^+ as aRb iff a/b then prove that $(Z^+, /)$ is also poset.
- Define the Composite relation.
Let $A = \{1, 2, 3\}$, $B = \{a, b, c\}$, $C = \{x, y, z\}$. Let $R = \{(1, b), (2, a), (2, c)\}$ from A to B and $S = \{(a, y), (b, x), (c, y), (c, z)\}$ from B to C. Find SoR, M_{SoR} . Also verify $M_{SoR} = M_R O M_S$.
- Solve the recurrence relation $a_n = 7a_{n-1} - 10a_{n-2}$, with $a_0 = 5$, $a_1 = 16$.

Q 2) Solve the following (any 4)

[20]

- Perform a postorder search on the following tree using postorder search algorithm.



- Define
 - ordered rooted tree
 - linked list representation using vertex and edge file.
- Write the Breadth First Search algorithm. Apply it on the following graph starting with vertex 'a'

