

Roll No.

Total Pages : 3

BT-3/D-18

33003

DISCRETE STRUCTURE

Paper : CSE 205(E)

Time : Three Hours]

[Maximum Marks : 100

Note : Attempt five questions in all, selecting at least one question from each unit. All questions carry equal marks.

UNIT-I

1. (a) Let R be the relation on set A = {a, b, c, d} defined by R = {(a, b), (b, c), (d, c), (d, a), (a, d), (d, d)}.

Determine (a) Reflexive closure of R and (b) Transitive closure of R. 10

(b) Prove the following proposition by PMI.

P(n) = 1/1(3) + 1/3(5) + + 1/(2n-1)(2n+1) = n/2n+1. 10

2. Let D100 = {1, 2, 4, 5, 10, 20, 25, 50, 100} and let the relation R(≤) be the relation (divides) a partial ordering on D100.

(i) Draw the Hasse Diagram for the above relation :

- (a) Determine the GLB of B, where B = {10, 20}.
(b) Determine the LUB of B, where B = {10, 20}.
(c) Determine the GLB of B, where B = {5, 10, 20, 25}.
(d) Determine the LUB of B, where B = {5, 10, 20, 25}. 16

(ii) Determine whether (D100, R) is a lattice or not. 4

UNIT-II

3. (a) Solve the recurrence relation ar+2 - 2ar+1 + ar = 2^r by the method of generating functions with the initial conditions a0 = 2 and a1 = 1. 10

(b) Find the particular solution of the difference equation ar+2 - 4ar = r^2 + r + 1. 10

4. (a) Solve the recurrence relation

ar+2 - 5ar+1 + 6ar = r^2. 10

(b) Find the particular solution of the difference equation ar+2 - 2ar+1 + ar = 3r + 5. 10

UNIT-III

5. (a) Consider an algebraic system (Q,*), where 'Q' is the set of all rational numbers and '*' is a binary operation defined by a * b = a + b - ab for all a, b in Q. Determine whether (Q, +) is a group or not. 10

(b) Explain Ring Homomorphism with example. 10

6. (a) Consider an Algebraic system (Q,*), q is set of rational numbers and * is defined as a * b = a + b - ab. for all a, b in Q. Determine whether (Q, +) is a group. 10

(b) Consider a Ring (R, +, *) is defined by a * a = a. Determine whether the ring is commutative or not. 10

UNIT-IV

7. (a) Explain various binary tree traversals with example. 10
(b) Determine whether $K_{2,3}$ is planar or not. 10
8. (a) Differentiate between homomorphic and Isomorphic graph with example. 10
(b) Explain Dijkstra's algorithm with example. 10
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