3151

B. Tech. 3rd Semester (CSE-AI & ML) Examination – December, 2022

DISCRETE MATHEMATICS

Paper : PCC-CSE-202-G

Time : Three Hours]   *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note :   Question No. 1 is *compulsory.* Attempt *one* question from each Unit.

1.   (i)   Define Equivalence Relation.

    (ii)   Define Power set theorem and Schroeder Bernstein theorem.

    (iii)   State Pigeon-hole principle.

    (iv)   Define Recurrence relation with example.

    (v)   What is Group and Semi group.

    (vi)   State Normal subgroup.

(ii)

(iii)
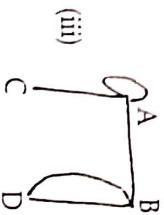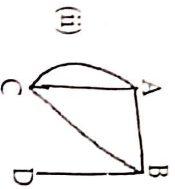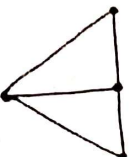

(b)   Write shortest notes of the following :

    (i)   Sub graph

    (ii)   Isomorphism

    (iii)   Multi graph and weighted graph

9.   (a)   Discuss the graph and their properties with suitable example.

    (b)   Find all spanning trees of the graph G in the following figure :

UNIT – I

2. (a) Establish the logical equivalance

$$[(p \to q) \to r] \Leftrightarrow [(p \lor r) \land (\sim (q \land (\sim r)))]$$

by truth table.

(b) Consider the following lattics :

(i) D_{20} (ii) D_{55}

(iii) D_{99} (iv) D_{130}

which of them are Boolean Algebra and what are their atoms.

3. (a) Is the Poset $A = \{2, 3, 6, 12, 24, 36, 72\}$ under the relation of divisibility a lattice ?

(b) Show that in a Boolean algebra for any a, b and c if $a \le b$ then (i) $a \lor c \le b \lor c$ (ii) $a \land c \le b \land c$.

UNIT – II

4. Let $A = \{1, 2, 3, 4, 5, 6\}$ resolve the following into disjoint cycles and find whether they are even or odd permutations :

(a) $(4135) \, 0 \, (563)$

(b) $(563) \, 0 \, (4135)$

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5. (a) Solve $a_n - 9a_{n-1} + 26\,a_{n-2} - 24\,a_{n-3} = 0$ for $n \ge 3$ $a_0 = 0$, $a_1 = 1, a_2 = 10$ by using generating function.

(b) Describe the Euclidean Algorithm.

UNIT – III

6. Write short notes of :

(i) Monoids

(ii) Group

(iii) Normal subgroups with proper examples.

7. Describe the following with suitable examples :

(i) Ring

(ii) Field

UNIT – IV

8. (a) Define a Eulerian graph. Examine if following are Euler graph :

(i)

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