

**Hall Ticket Number:**

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**II/IV B.Tech (Supplementary) DEGREE EXAMINATION****April, 2018****Third Semester****Time:** Three Hours**Common to CSE & IT****DISCRETE MATHEMATICAL STRUCTURES****Maximum : 60 Marks***Answer Question No.1 compulsorily.*

(1X12 = 12 Marks)

*Answer ONE question from each unit.*

(4X12=48 Marks)

1. Answer all questions

(1X12=12 Marks)

- Define Relation.
- Give the example for Disjoint sets.
- What Strong mathematical induction?
- Define permutation and Combination.
- What is Recurrence relation?
- Define Generating function.
- What is Non Homogenous recurrence relation?
- Define Equivalence relation.
- Define Enumeration.
- Give the example for Adjacency matrix.
- Define Multi graph.
- What is Four colour problem.

**UNIT I**

- Prove that the following is tautology:  $\sim(p \vee q) \vee ((\sim p) \wedge q) \vee p$  6M
- Prove or Disprove the validity of the following argument.(Using Quantifiers)

All men are fallible.

All kings are men.

All kings are fallible.

6M

**(OR)**

- Determine whether the following inferences are valid or invalid.

 $p \rightarrow q$  $q \rightarrow r$  $r \rightarrow s$ 

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 $p \rightarrow s$ 

6M

- Prove that  $1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2}$  for any  $n \in \mathbb{Z}^+$ . 6M

**UNIT II**

- How many 2 digit or 3 digit numbers can be formed using the digits 1, 3, 4,5,6,8 and 9 and repetitions are not allowed. 6M
- In how many ways can a committee of k people can be chosen from 10 people, If k can be 1,2,3,--- or 10. 6M

**(OR)**

- Find the coefficient of  $X^{21}$  in  $(X^2 + X^3 + \dots + X^6)^8$ . 6M
- Explain Generating function sequence. 6M

**UNIT III**

- Solve for an given that  $a_0 = 0$ ,  $a_1 = 6$  and  $a_n = -3a_{n-1} + 10a_{n-2} + 3 \cdot 2^n$ , for  $n \geq 2$ . Using Generating function method. 6M
- Solve the recurrence relation  $a_n = 6a_{n-1} - 9a_{n-2}$  with initial conditions  $a_0 = 4$ ,  $a_1 = 6$ .using characteristic roots method. 6M

**(OR)**

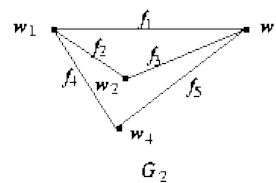
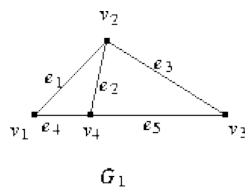
7. a) Explain the operations on Relations. 6M  
 b)  $\{(1,2),(2,3),(4,4),(5,4),(5,7)(1,2),(2,3),(4,4),(5,4),(5,7)\}$ . 6M  
 In the above relation, Find the Transitive closure.

**UNIT IV**

8. a) Draw the Hasse diagram for the following relation.[D12;/] 6M  
 b) Give the Example for Topological sorting. 6M

**(OR)**

9. a) Prove or disprove the following graphs are isomorphic or not.



6M

- b) Prove or disprove the graph  $K_5$  is planar or non planar graphs. 6M