**14CS302/14IT302**

**Hall Ticket Number:**

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**II/IV B.Tech (Supplementary) DEGREE EXAMINATION**

**April, 2018** **Common to CSE & IT**

**Third Semester** **DISCRETE MATHEMATICAL STRUCTURES**

**Time:** Three Hours **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)
   a) Define Relation.
   b) Give the example for Disjoint sets.
   c) What Strong mathematical induction?
   d) Define permutation and Combination.
   e) What is Recurrence relation?
   f) Define Generating function.
   g) What is Non Homogenous recurrence relation?
   h) Define Equivalence relation.
   i) Define Enumeration.
   j) Give the example for Adjacency matrix.
   k) Define Multi graph.
   l) What is Four colour problem.

**UNIT I**

2. a) Prove that the following is tautology: ~(pvq)v((~p)^q)vp 6M
   b) Prove or Disprove the validity of the following argument.(Using Quantifiers)

   All men are fallible.
   All kings are men. 6M
   All kings are fallible.

**(OR)**

3. a) Determine whether the following inferences are valid or invalid.

   p->q
   q->r
   r->s
   --------
   p->s 6M

   b) Prove that $1+2+3+...+n=\frac{n(n+1)}{2}$ for any n ∈ Z +. 6M

**UNIT II**

4. a) 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
   b) 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)**

5. a) Find the coefficient of $X^{21}$ in $\left(X^2+X^3+...+X^6\right)^8$ . 6M
   b) Explain Generating function sequence. 6M

**UNIT III**

6. a) Solve for an given that $a_0=0,\ a_1=6$ and $a_n=-3a_{n-1}+10a_{n-2}+3\,.\,2^n$, for n ≥ 2. Using Generating function method. 6M
   b) 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)**

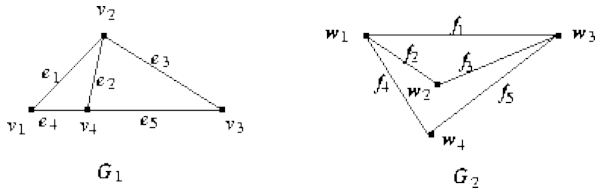
7. a) Explain the operations on Relations. 6M
   b) {(1,2),(2,3),(4,4),(5,4),(5,7)(1,2),(2,3),(4,4),(5,4),(5,7)}. 6M
   In the above relation, Find the Transitive closure.

**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 K5 is planar or non planar graphs. 6M