**P V P SIDDHARTHA INSTITUTE OF TECHNOLOGY:: VIJAYAWADA**

**(AUTONOMOUS)**

**II B.TECH I SEMESTER**

**(CS3T1- MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE)**

**Time: 3Hrs Max.Marks : 70**

**Answer any 5 Questions:**

1. (a) Construct the truth tables of the following formulas [6]

i) (Q (P 🡪Q)) 🡪P

ii) ($\~$*P* *R*) (*Q* *P*)

 (b) Show that the proposition: (P∨∼Q)∧(∼P∨∼Q) ∨Q is a tautology. [8]

2. (a) what are the different types of normal forms and Obtain the principal disjunctive

 normal form of (P ^Q) v ($\~P$^R) v (Q^ R)? [ 7 ]

 (b) Obtain principal conjunctive normal form of (P^Q)V($\~P\^Q\^R)$? [ 7 ]

3. (a) Show that $\~P $follows logically from the premises $\~($P^$\~$Q), $\~$QvR, $\~$R ? [ 7]

 (b) Find and prove a formula for the sum of the first n cubes 13+23+………n3

Using mathematical induction? [ 7 ]

4.(a) what is sum rule and product rule ? [ 4 ]

 (b) Compute P(8,5) and C(6,3) ? [ 5 ]

 (c ) How many ways are there to distribute 10 different books among 15 people if no

 person is to receive more than one book? [ 5 ]

5. Solve an-7an-1+10an-2=0, n$\geq 2$ with a0=10 a1=41? [14]

6. (a) Define relation? What are the special properties of relations ? [ 7 ]

 (b) What is Lattice? Show that (D6 , /) is a Lattice? [ 7 ]

7. (a) Consider the relation R={(a,b),(b,c), (b,d),(d,a),(c,c)} Draw digraph for the relation

 R , and represent adjacency matrix? [ 7 ]

 (b) Let A={a,b,c,d,e} and let R={(a,a),(a,b),(b,c)(c,d),(c,e),(d,e)}. Compute the

 transitive closure of R. [ 7 ].

8. (a) Define isomorphism of directed graph? Are the two graphs are isomorphic or not?

 [ 7]

G2

G1

 (b) Define chromatic number? Find the chromatic number for the following graph? [ 7 ]

 A

**B**

 **F**

 **E D C**