Q.No. MAO441

B.Tech/Even
Reg/2022-23

2022-23

Discrete Mathematical Structures

MAO441

Full Marks:25 **Time: One Hour Thirty Minutes**

Answer any five questions (5x5=25)

1. Define indirect Proof and then prove by induction $1+2+.....+(2k-1)=k^2$. Define Proof by Contraposition.
2. Let $\{a_n\}$ be a sequence of natural numbers such that $a_1=5$,$a_2=13$ and $a_{n+2}=5a_{n+1}-6a_n$ for all natural numbers n. Prove that $a_n=2^n+3^n$.
3. Prove that $2^n > n^2$ for all natural numbers $n\geq 5$ using Induction.
4. Write "Warshalll's" algorithm to find out the transitive closure of a relation.
5. Write the equivalent form of " p implies q" and " p if and only if q". Define Tautology, Contradiction with example.
6. Define an equivalence relation. ,Let R is a relation on a set of integers such that **aRb** is 'a=b' a,b are integers, is the relation **R** is an equivalence relation?
7. If A is a set such that A= {1,2,3,4} and R1 is a relation R1={(1,1), (2,3), (2,2),(1,3)}, find out reflexive and symmetric closures of this relation. Define transitive closure of a relation with example.