MARWARI COLLEGE, RANCHI
BACHELOR IN INFORMATION TECHNOLOGY
END SEMESTER EXAMINATION, SEMESTER –III

TIME: 3 HOUR
Sub: DISCRETE STRUCTURE

FULL MARKS: 60
Paper: C4

Group A is compulsory

GROUP A

1*10=10

1. **a)** State which rule of inference is the basis of the following argument: "It is below freezing now. Therefore, it is either below freezing or raining now."
   b) Define set?
   c) What is empty set? Show with example?
   d) What is the Cartesian product of A ={1,2}and B ={a, b, c}?
   e) What are the basic counting principles?
   f) Define Permutation?
   g) What is symmetric and anti-symmetric relation?
   h) Define Graph?
   i) What is pendent edge?
   j) Define regular graph with example?

2. Construct the truth table of the compound proposition $(p \vee \neg q) \rightarrow (p \wedge q)$. **5*1=5**

GROUP B

Direction: Answer any Three **15*3=45**

1. What do you mean by tautology? Show that $(p \wedge q) \rightarrow (p \vee q)$ is a tautology.
2. Prove that **The maximum number of edges in a simple graph with 'n' vertices is n(n-1)/2?**
3. Discuss the concept of Relation, their types with suitable example for each one?
4. Show that if n is a positive integer, then
   $1+2+\cdots+n = n(n+1)/2$
5. Prove that **The sum of degree of all the vertices is equal to twice the number of edges?**