**Que-1 Attempt any Seven [14]**

1. Define: Sylow P-subgroup of G. What is order of sylow p-subgroup of G?
2. Let R be a ring , ideal of two rings and those intersection is again a ideal.
3. Let r be a ring and I and J be a two ideals of R. Define I+J and prove that I+J is also a ideal.
4. State A syclow’s first rule.
5. State the fundamental theorem of homomorphism
6. Define: Primitive polynomial.
7. Define: Irreducible polynomial and deduce that example.
8. For any group G verify that $G/G^{,}$ is a abelian.
9. Establish that the fact that any finite group of order 37 is simple.
10. Detrmine all the ideals of ring Z/110Z

**Que-2 Attempt the followings [14]**

1. Illustrate an example in which set commutative property is not satisfied. And why give a reason.

OR

How can we say that any element is non-singular.

1. Give an example which does not satisfied a commutative and Associative property in the set G.

**Que-3 Attempt the followings [14]**

(a)Prove that every group G is isomorphic to a subgroup of $S\_{G}$.

 OR

 Every irreducible element of PID R is always a prime element.

 b) Every Euclidian domain is also principle ideal domain.

**Que-4 Attempt the followings [14]**

1. Prove that one-one correspondence between the family F of non-isomorphic groups of order $P^{n}$ . Where p is prime and the set p(n) of partition of n.

OR

If $H\_{1}………H\_{m}$ are nilpotent groups, then prove that $H\_{1}×………×H\_{m}$ is also a nilpotent.

b) Let G be a group of order pq where p and q are prime numbers such that p < q and p does not devide q-1 . prove that G must be Cyclic deduce that there exist no subgroups g such that $o\left(\frac{G}{z\left(g\right)}\right)=15$

**Que-5 attempt any two. [14]**

a) Define prime ideal. Let R be a commutative ring , $1\in R$ and P is an ideal of R with P$\ne $ R. Prove that P is a prime ideal if and only if R/P is an integral ideal.

b) Let A, B be two ideals of a ring R. Define AB, the product of two ideals . Prove that AB is also an ideal of R.

c) Prove that $A\_{n}\geq 5$ is asimple group.

d) State and prove Eisenstein Criterion