Sudharsan College of Arts and Science

Perumanadu – Pudukkottai

ABSTRACT ALGEBRA

Class : III B.Sc Maths **Total : 75 Marks**
Sub Code: 16SCCMM12 **Time: 3 Hours**

Section – A

Answer all the quetions: **(10×2=20)**

1. Define Group.
2. Define Cyclic group and Given an example.
3. Define left and right cosets
4. Prove that any cyclic group is abelian
5. Define Normal subgroup and given an Example
6. If F is homomorphim and F is 1-1, then prove that Ker F={e}.
7. Define quotient Rings.
8. Define a zero- divisor.
9. Define divisor.
10. Define Euclidean domain.

Section – B

Answer ALL the questions: **(5×5=25)**

11. a) state and prove Euler's theorem.

Or

b) prove that a subgroup of cyclic group is cyclic

12. a) Such that the Perumation n { 1,2,3 }.

Or

b) If R is a ring such that a^2 = a for all aЄ R, P.T (i) a+a = 0 (ii) a+b= o→a =b (iii) ab =ba

13. a) Zn is an integral domainiffn is prime .

Or

b)Such that every finite cyclic group of order n is isomorphism to (Zn, +)

14. a) Let f:G→G′ be a homomorphism then the kernel Kof F is a normal subgroup of G

Or

b) Every subgroup of an abelian group is a normal subgroup

15.a) Let G be a group and a,b ϵ G then
1.O(a) = O(a^{-1})
2.O(a) = O($b^{-1}ab$)
3.O(ab) = O(ba)

Or

b) If H is a subgroup of G and N is a normal subgroup of G then prove that HN is a subgroup of G.

Section –C

Answer Any THREE Questions **(3×10=30)**

16.A and B are subgroup of a group G. Prove that AB is a subgroup of Giff AB=BA.

17.Prove that any permutation can be expressed as a product of disjoint cycles.

18.State and proveCayley's theorem.

19. Let R and R′ be rings and f:R→R′ be an isomorphism . Then
(i) R is the commutative → R′ is the commutative.
(ii) R is ring with identity → R′ is ring with identity.
(iii) R is an indegral domain → R′is an indegraldomain.
(iv) R is a field → R′ is a field.

20.State and prove Fundamental theorem of homomorphism on groups

☺☺ **ALL THE BEST** ☺☺