

Prabhat Kumar College, Contai

Department of Mathematics

4th Semester Mathematics (General) CBCS Pattern

Paper: DSC-3D

Time: 1 hours

Answer any one :-

1. Let G be a group and $a \in G$ such that $\circ(a) = n$. Prove that for every positive integer t
 $\circ(a^t) = \frac{n}{\gcd(t,n)}$.
2. Let G be a finite cyclic group of order m . Prove that for every divisor d of m , there exists a unique subgroup of G of order d .
3. Prove that every group of prime order is cyclic.
4. Let H be a subgroup of a finite group G . Then prove that order of H divides the order of G .
5. Prove that every finite integral domain is a field.
6. Show that $\mathbb{Q}[\sqrt{3}] = \{a + b\sqrt{3} \in \mathbb{R} \mid a, b \in \mathbb{Q}\}$ is a subfield of the field \mathbb{R} .