

ALGEBRA I
Mid-Term Examination
19 September 2006

Instructions: Some questions are simpler than others. Therefore, read the entire question paper carefully before attempting to answer. All questions carry equal marks.

1. State and prove Lagrange's theorem.
2. Determine the order sequence of a cyclic group of order 20.
3. Classify all groups that have at most three conjugacy classes.
4. Prove that there exists a unique group of order 15.
5. Let N be the normaliser of a Sylow subgroup of a finite group G .
Prove that N is normal in G if and only if $N = G$.
6. Prove that no group of order 30 is simple.