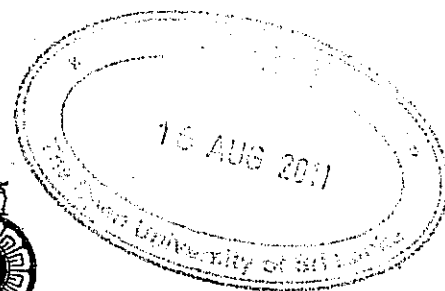


The Open University of Sri Lanka
B.Sc./B/Ed. Degree Programme-2010/2011
Closed Book Test (CBT)
Pure Mathematics
PUU2144-Group Theory I



Duration: One and Half Hours

Date: 18.10.2010

Time: 4.00pm-5.30pm

Answer All Questions

1. (a) In S_4 , find the subgroup H generated by $(1\ 2\ 3)$ and $(1\ 2)$.

For the subgroup H of S_4 find the corresponding subgroup $\sigma H \sigma^{-1}$ for $\sigma = (1\ 4)$.

(b) Show that each element in A_4 can be written as a product of 3-cycles.

2. State and prove the Lagrange's theorem.

Find all the subgroups of $\mathbb{Z}_{12} = \{1, a, a^2, \dots, a^{11}\}$.

Determine whether \mathbb{Z}_8 has a subgroup of order 5.

3. (a) Show that each subgroup of an abelian group is normal.

(b) If $H \leq G$ such that $|G:H| = 2$ then $H \trianglelefteq G$.