The Open University of Sri Lanka
B.Sc./B.Ed. Degree Programme
No Book Test (NBT) - 2019/2020
Pure Mathematics - Level 04
PEU4303 –Group Theory I

Date: 15-08-2020 **Time: 4.00 p.m. – 5.00 p.m.**

Answer all the questions

Question (01)

Consider the following groups

(i) $(Z_6, +_6)$ (ii) $(Z_8^{\times}, \times_8)$ (iii) S_3

(a) Write down the elements of each of the above groups.

(b) Find the order of each of the elements of above groups.

(c) Find the inverse of each of the elements of above groups.

(d) Find all the subgroups of each of the above groups.

Question (02)

(a) Let $(G, *)$ be a group. Then prove that;

(i) for every $a, b \in G$, $(a * b)^{-1} = b^{-1} * a^{-1}$.

(ii) if for every $a, b \in G$, $(a * b)^2 = a^2 * b^2$, then G is abelian.

(b) Prove that S_3 is a non abelian group.

(c) Determine whether $(Z_8^{\times}, \times_8)$ is a cyclic group.

(d) Determine the complete lattice diagram of $(Z_8^{\times}, \times_8)$.