The Open University of Sri Lanka

B.Sc/B.Ed. Degree Programme – Level 04

NO Book Test– 2024/2025

Pure Mathematics

PEU4303 – Group Theory 1

Duration: - One Hour.

Date: -15 .03.2025 **Time: - 10.30 a.m. – 11.30 a.m.**

Answer All Questions.

(01) Show that $\{0,3,6,9\}$ is a subgroup of $(\mathbb{Z}_{12},\oplus)$.

(02) Let $G = (\mathbb{Z},+)$, $N = \{3x | x \in G\}$. Show that N is a subgroup of G.

(03) Let $G = \{e, a, a^2, a^3, a^4, a^5\}$ be a group under multiplication. Find order of a and a^2.

(04) Prove that the group $(H,\otimes)$ where H is a subset $\{1,2,4,5,7,8\}$ of $\mathbb{Z}_9$ is cyclic. Find all the generators.

(05) Let $G = \langle a \rangle$ be a group under multiplication, with $o(G) = 8$. Let $H = \langle a^2 \rangle$. Find distinct right cosets of H .

(06) Write the permutation $(1\ 3\ 2\ 5)(1\ 2\ 4\ 6)(3\ 6)$ as product of disjoint cycles.

(07) Give the inverse of $(2\ 3\ 5)(1\ 5\ 4)$.

(08) Give the order of $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 7 & 6 & 1 & 5 & 4 & 2 & 3 \end{pmatrix}$.