The Open University of Sri Lanka
B.Sc/ B.Ed Degree Programme
Open Book Test (OBT) -2024/2025
Pure Mathematics – Level 03
PEU3301 – Foundations of Mathematics

DURATION: ONE HOUR

Date: 13.10.2024 **Time: 1.00 p.m. – 2.00 p.m.**

ANSWER **ALL** QUESTIONS.

1. For any sets A and B, prove that $A \cap B \subseteq A \subseteq A \cup B$. [20-marks]

2. Show whether the relation $(x, y) \in R$, defined by $x \geq y$ on the set of positive integers, is a partial order relation. [25-marks]

3. Show that $[-4, 9)$ is equivalent to $(-4, 9]$, and hence $|[-4, 9)| = |(-4, 9]|$. [25-marks]

4. For each $x \in [3, 5)$, let $f(x) = 3x + 5$, a function from [3, 5) into [14, 20). If it exists find the inverse function $f^{-1}(x)$. [20-marks]

5. Find the first three terms of the sequence $\langle x_n \rangle$ where $x_n = \frac{(\pi-8)(n^3-6n^2-6)-(\pi-12)n}{5}$ for $n \in \mathbb{Z}$. [10-marks]

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