THE OPEN UNIVERSITY OF SRI LANKA

BSc DEGREE PROGRAMME - LEVEL 05

Open Book Test (OBT) -2024/2025

PEU5303– Number Theory

DURATION: ONE HOUR

Date: 23-02-2025 **Time: 09.00am-10.00 am**

ANSWER ALL QUESTIONS.

01. (a) Prove that $\sqrt{2} - \sqrt{3}$ is an irrational number.
(Hint: You may assume that $\sqrt{2}$,$\sqrt{3}$ are irrational numbers.)

(b) Determine that the least element exists for the set.
$S = \{2024n - 2125 \mid n \in \mathbb{N}\}$. Justify your answer.

02. (a) (i) Find the gcd (greatest common divisor) of 3345 and 1800.

(ii) Hence find two integers x, y such that
$\gcd(3345,1800) = 3345x + 1800y$.

(iii) Find the solutions of each of the linear Diophantine equations, if those exist:

I. $3345x + 1800y = 75$.
II. $3345x + 1800y = 20$.

(b) Solve the linear congruence equation; $6x \equiv 15(mod\ 21)$.

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