THE OPEN UNIVERSITY OF SRI LANKA

BSc DEGREE PROGRAMME - LEVEL 05

No Book Test (NBT) -2024/2025

PEU5303– Number Theory

DURATION: ONE HOUR

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Date: 22-03-2025 Time: 02.30pm-03.30pm

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ANSWER ALL QUESTIONS.

01. (a) Find the least positive integer that yields the remainders 1,3 and 5 when divisible by 5,7 and 9 respectively.

(b) Let $M = a_0 + 10a_1 + 10^2a_2 + 10^3a_3 + 10^4a_4 + 10^5a_5$ be the base 10 representation of the positive integer $M$. Prove that $4|M$ if and only if $4|(a_0 + 10a_1)$.

(c) ISBN Number of the book " Introduction to Number Theory Peter D. Schumer" is ISBN $0 - 53 - 494626 - 7$. Check whether the check digit is correct.

02. (a) Show that the set $\{1^2, 2^2, 3^2, \ldots\ldots, m^2\}$ is not a complete set of residues modulo $m$, for $m > 2$.

(b) Is the set $\{-7, 31, 22, -1\}$ forms a reduced set of residues modulo 5? Justify your answer.

(c) Write the Contrapositive statement of the statement,
" If $p$ is a prime number then for any integer $a$, $a^p \equiv a(mod\ p)$".
Hence show that 15 is not a prime number .

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