

The Open University of Sri Lanka
B.Sc/B.Ed. Degree Programme – Level 05
No Book Test (NBT) – 2023/2024
Pure Mathematics
PEU5303 – Number Theory
Duration: - **One Hour.**



Date: 09.02.2024

Time: 01.00 PM – 02.00 PM

Answer All Questions

1. (a). Find the least positive integer that yields the remainders 1, 2 and 3 when divided by 3, 5, and 7 respectively.
 - (b). Show that the set $\{0, 1, 2, 2^2, 2^3, 2^4, 2^5, 2^6, 2^7, 2^8, 2^9\}$ is a complete set of residues modulo 11.
 - (c). Is the set $\{3, 3^2, 3^3, 3^4, 3^5, 3^6\}$ form a reduced set of residues modulo 14? Justify your answer.
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2. (a). State the Fermat's Little Theorem.
 - (i). Use the above theorem to verify that 13 divides $11^{126} + 1$.
 - (ii). Let p and q be distinct primes. Use the Fermat's Little Theorem to prove that $a^{pq} \equiv a \pmod{pq}$.
 - (b). Find the remainder when $2(26!)$ is divided by 29.
 - (c). When $n = 14, 206$ and 957 , show that $\sigma(n) = \sigma(n + 1)$.