The Open University of Sri Lanka
B.Sc./B.Ed. Degree Programme
Pure Mathematics – Level 05
PEU5303- Number Theory
NO BOOK TEST (NBT) – 2021/2022

DURATION: ONE (01)–HOUR

Date: 11.02.2023. **Time: 10.30.a.m - 11.30 a.m.**

Answer All Questions

(01) (a) Find the least positive integer that yields the remainders 1, 2 and 3 when divided by 3,4 and 5 respectively.

(b) Determine whether or not each of the following is true. Give reasons in each case.

(i) There is no integer x s.t $12x \equiv 7(mod\ 33)$,

(ii) The ISBN number of the book "Number Theory With Computer Applications, Ramanujachary Kumanduri, Cristina Romero" is ISBN 0-13-801812-X. Find if the ISBN check digit is correct,

(iii) $\{2^{40}, 9^{15}, 10^{10}, 7^7, 8^3\}$ is a complete set of residue modulo 5.

(02) (a) The converse of the Fermat's Little Theorem is not true. Justify your answer.

(b) (i) Show that $128^{129} \equiv 9\ (mod\ 17)$,

(ii) Find 2014^{2015} modulo 5.

(c) Show that $18! \equiv -1\ (mod\ 437)$.

(Hint: 437=19.23)

(d) Prove that if $n > 1$, then $\sigma(n) \geq n + 1$.