The Open University of Sri Lanka
B.Sc/ B.Ed Degree Programme
No Book Test (NBT) -2023/2024
Pure Mathematics – Level 05
PEU5305 – Complex Analysis I

DURATION: ONE HOUR

Date: 01.09.2023 **Time: 2.30 p.m. – 3.30 p.m.**

ANSWER **ALL** QUESTIONS.

1. Let $f(z) = \frac{1}{z-2}$ and let C be the semicircle oriented counterclockwise and centered at $z = 2$ with radius 1, from $z = 3$ to $z = 1$ lying in the upper half-plane.

   i. Find the parametric representation $z(\theta)$ of C.

   ii. Evaluate $\int_C f(z)dz$.

2.

   i. State **Modulus-Length Inequality** theorem.

   ii. Without evaluating the integral, show that $\left|\int_{|z|=4} \frac{dz}{z^2+9}\right| \leq \frac{8\pi}{7}$.

3.

   i. State **Cauchy's Integral Formula for the Derivative**.

   ii. Evaluate $\int_C \frac{\cos z}{(4z-\pi)^2}\, dz$, where C the unit circle, oriented counterclockwise.

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