The Open University of Sri Lanka
B.Sc/B.Ed. Degree Programme
No Book Test (NBT) - 2017/2018
Pure Mathematics - Level 05
PEU5305 Complex Analysis I

Duration: One Hour

Date: 19.07.2018 **Time: 04.15pm - 05.15pm**

Answer ALL questions.

1. (a) Using the $\epsilon - \delta$ definition, show that $\lim_{z \to 1+i} z^2 = 2i$.

   (b) Let $f(z) = \dfrac{z^2}{|z|}$. Does $\lim_{z \to 0} f(z)$ exist? Justify your answer.

2. Let $f(z)$ be defined by $f(z) = \dfrac{x^3 + iy^3}{2x^2 + 3y^2}$ if $z = x + iy \neq 0$, where x and y are real, and $f(0) = 0$.

   (a) At which points, the Cauchy-Riemann equations satisfied? Justify your answer.

   (b) At which points $f(z)$ is differentiable? Justify your answer.

3. Let $f(z)$ be analytic in a region G. Show that if $|f(z)|$ is constant in G, then $f(z)$ is constant in G.