The Open University of Sri Lanka
Department of Mathematics
B.Sc/ B.Ed Degree Programme
No Book Test - 2017/ 2018
Pure Mathematics– Level 05
PEU5304– Introduction to Complex Analysis

DURATION: ONE HOUR

Date: 21 – 07 – 2018 **Time: 2.30 p.m. – 3.30 p.m.**

ANSWER ALL QUESTIONS

01. State the De Moivre's theorem for all integers. [05 mark]

(a) Express $cos3\theta$ in terms of $cos\theta$ and $sin3\theta$ in terms of $sin\theta$. [10 mark]

(b) Evaluate $\left\{\frac{\sqrt{5}}{2}\left[cos\left(\frac{\pi}{4}\right)+i\,sin\left(\frac{5\pi}{4}\right)\right]\right\}^6$. [10 mark]

(c) Determine the primitive fourth roots of unity. [10 mark]

02. Show that $1+i$ is a root of the polynomial $p(z)=z^3-6z^2+10z-8$. [05 mark]

Solve the polynomial equation $p(z)=0$. [15 mark]

03. Show that $\exp(\overline{z})=\overline{\exp(z)}$ for each complex number z. [10 mark]

04. Solve the equation $cosz=3$. [15 mark]

05. Show that $\log\left(\frac{z_1}{z_2}\right)=\log(z_1)-\log(z_2)$. [10 mark]

Is $\mathrm{Log}\left(\frac{z_1}{z_2}\right)=\mathrm{Log}(z_1)-\mathrm{Log}(z_2)$? Justify your answer. [10 mark]