THE AMERICAN COLLEGE, MADURAI

(An Autonomous Institution Affiliated to Madurai Kamaraj University)
Re-accredited (2nd Cycle) by NAAC with Grade "A", CGPA – 3.46 on a 4-point scale

Backlog Arrear Examination, March 2021

MAT/MAS 3614/3442/3631/3608/337 **Time: 3hrs**
Complex Analysis **Max: 75marks**

Answer any FIVE questions: **5x15=75**

1. (a) Find the invariant points of the transformation $w = \frac{1+z}{1-z}$

   (b) Prove that any bilinear transformation preserves cross ratio.

   (c) Find the image of the strip $2 < x < 3$ under the map $w = \frac{1}{z}$.

2. (a) Determine the angle of rotation and scale factor at the point $z = 1 + i$ under the mapping $w = z^2$

   (b) Find the analytic function $f(z) = u + iv$ given that $u - v = e^x (cos\, y - \sin y)$.

3. State and prove Cauchy's integral formula.

4. State and Prove Laurent's theorem.

5. (a)State and prove Rouche's theorem.

   (b) Using Contour integration evaluate $\int_0^{2\Pi} \frac{d\theta}{13+5sin\theta}$.

6. State and prove the necessary and sufficient condition for differentiability of complex functions

7. (a) State and prove Maximum modulus theorem

   (b) State and prove Argument's theorem.

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