School of Basic and Applied Sciences

Mathematics

ETE - Jun 2023

Time : 3 Hours **Marks : 50**

Sem II - MSCM202 - Complex Analysis

Your answer should be specific to the question asked

Draw neat labeled diagrams wherever necessary

1.	Describe Rouche's Theorem	K2 CO2	(2)
2.	Describe Cauchy integral formula	K2 CO1	(2)
3.	Write necessary condition for transformation to be conformal.	K2 CO1	(2)
4.	Define a pole of order 'n' and give an example.	K1 CO2	(2)
5.	Express in the form of the x + i y $log(-1+\sqrt{3}i)$.	K1 CO1	(2)
6.	$If\ w = \log z\, , find\ \frac{dw}{dz}$ and determine where w is non-analytic.	K3 CO3	(5)
7.	Apply Cauchy's integral formula, determine $\oint_{c:\lvert z+3i\rvert=1} \frac{dz}{z(z+\pi i)}$.	K3 CO3	(5)
8.	Expand the function $f(z) = \frac{z+3}{z(z^2-z-2)}$, $in\ the\ regions\ given\ by\ i)\ 1 < \lvert z\rvert < 2\ and\ ii)\ \lvert z\rvert > 2$.	K4 CO4	(6)
9.	Applying residue's theorem, evaluate real integral $\int_{-\infty}^{\infty} \frac{x^2}{(x^2+1).(x^2+4)} dx$.	K4 CO4	(8)
10.	Show that resultant of two Mobious transformations is also Mobious transformation. And if $T_1(z) = \frac{z+2}{z+3}$, $T_2(z) = \frac{z}{z+1}$. Find $T_2\, T_1(z)\ and\ {T_2}^{-1}(T_1(z))$.	K4 CO4	(8)
11.	State and prove Taylor's series for an analytic function inside a circle, centred at point 'a' .	K3 CO4	(8)