Vivekananda College of Engineering & Technology, Puttur
[A Unit of Vivekananda Vidyavardhaka Sangha Puttur ®]
Affiliated to VTU, Belagavi & Approved by AICTE New Delhi

CRM08	Rev 1.10	BS	29/06/22

CONTINUOUS INTERNAL EVALUATION – 3

Dept:BS(MAT)	Sem / Div: IV/A&B	Sub: Complex Analysis, Probability and Statistical Methods	S Code: 18MAT41
Date: 04/07/2022	Time: 9:30-11:00 am	Max Marks: 50	Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

QN	Questions	Marks	RBT	CO's
	PART A			
1 a	Derive Cauchy-Riemann equation in the Polar form.	8	L2	CO1
b	Find the analytic function $f(z)$ whose real part is $u = e^{2x}(x\cos 2y - y\sin 2y)$	8	L2	CO1
c	Show $u = x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$ is harmonic and find its harmonic conjugate. Also find the corresponding analytic function.	9	L2	CO1
	OR			
2 a	Show that real and imaginary parts of an analytic function are harmonic in Cartesian form.	8	L2	CO1
b	Show that $w = z^n$ where n is a positive integer is analytic and hence find its derivative.	8	L2	CO1
c	Find the analytic function $f(z)$ given $u - v = e^x(\cos y - \sin y)$	9	L2	CO1
	PART B			
3 a	Evaluate $\int_c \dfrac{dz}{z^2 - 4}$ over the following curves	8	L3	CO1

(a) $|z|=3$ (b) $|z+2|=1$			
b State and prove Cauchy's Theorem.	8	L3	CO1
c Discuss the transformation $w=z^2$	9	L3	CO1
OR			
4 a Verify Cauchy's theorem for $f(z)=z^2$ where C is the square having the vertices $(0,0),(1,0),(1,1)$ and $(0,1)$	8	L3	CO1
b State and prove Cauchy's integral formula.	8	L3	CO1
c Find the Bilinear transformation which maps $z=\infty, i, 0$ into $w=-1,-i,1$. Also find the fixed points of the transformation.	9	L2	CO1

MRPai

29/6/22

Prepared by: Madhavi R Pai

HOD: Prof. M Ramananda Kamath

29/6/22