SJT-702-(3+

VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)
Vellore – 632014, Tamil Nadu, India
DEPARTMENT OF MATHEMATICS
SCHOOL OF ADVANCED SCIENCES
FALL SEMESTER 2022-2023

CONTINUOUS ASSESSMENT TEST – I

Programme Name & Branch : **B.Tech. (All branches)**

Course Code : BMAT201L
Course Name : Complex Variables and Linear Algebra
Slot : C2+TC2+TCC2
Date of the Examination : 30.8.22
Duration : **90minutes** **Max. Marks : 50**

Answer all the Questions (5*10=50)

Q. No	Quesion	Marks	Course Outcome (CO)	Bloom's Taxonomy (BL)
1.	Examine whether the given function $\cos x \cosh y$ can be the real part of an analytic function $f(z)$. If so, find its conjugate and also the analytic function $f(z) = u + iv$.	10	1	BL2
2.	Prove that $u(x,y) = x^2 - y^2$ and $v(x,y) = \frac{y}{x^2+y^2}$ are harmonic function and Examine whether $f(z) = u + iv$ is not analytic.	10	1	BL3
3.	Show that the transformation $w = \frac{2z+3}{z-4}$ transforms circle $x^2 + y^2 - 4x = 0$ into straight line $4u + 3 = 0$.	10	2	BL3
4.	Find the bilinear transformation which maps $z = 0$ onto $w = -i$ and has -1 and 1 as invariant points. Also show that under this transformation the upper half of the z-plane maps onto the interior of the unit circle in the w-plane.	10	2	BL3
5.	Find the Taylor's series $f(z) = \frac{e^z}{1-z}$ about $z = 0$. Give the radius of convergence.	10	3	BL1

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