VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act 1956)

Continuous Assessment Test –II

Programme Name & Branch: B.tech (Common to all) **Exam Duration: 90 mins** **Slot: C2+TC2+TCC2**

Semester: Winter **Maximum Marks: 50**

Course Code: MAT3003 **Course Title: Complex Variables and Partial Differential Equations**

Exam Mode: Closed book

Answer any five questions

1.a	Classify the singularities for the given Complex function $f(z) = (1-z^3)e^{\frac{1}{z}}$	5
1.b	Evaluate using Cauchy's integral formula, $\int_c \frac{z+1}{z^2+2z+4}dz$ where C is the circle $\lvert z+1+i\rvert = 2.$	5
2.	Evaluate $\int_0^{2\pi} \frac{d\theta}{13+5\sin\theta}$, using Contour integration.	10
3.	Prove that $\int_0^{\infty} \frac{\cos mx}{(1+x^2)^2}dx = \frac{\pi}{4}(m+1)e^{-m}, m>0$, using Contour integration.	10
4 a.	Form the partial differential equation by eliminating the arbitrary constants *a* and *b* from $z = xy + y\left(\sqrt{x^2+a^2}\right)b.$	5
4 b.	Form the partial differential equation by eliminating the arbitrary function ϕ from $\phi = \left(x+y+z, xy+z^2\right) = 0.$	5
5.	Solve the Lagrange Linear equation $(x^2-yz)p + (y^2-zx)q = z^2-xy.$	10
6. a	Solve: $z = px + qy + \sqrt{1+p^2+q^2}$	5
6. b	Solve: $p(1+q) = qz.$	5