



# 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 – II

Programme Name & Branch : BTech  
 Course Code : BMAT201L  
 Course Name : Complex Variables and Linear Algebra  
 Slot : C2+TC2+TCC2  
 Date of the Examination : 12.10.22  
 Duration : 90 minutes Max. Marks : 50

Q. No	Question	Marks
✓ 1.	Find the Laurent's series expansion of $f(z) = \frac{1}{(z^2+1)(z^2+2)}$ in the region a) $1 <  z  < \sqrt{2}$ b) $ z  > \sqrt{2}$	10
✓ 2.	a) Find the residue of $\frac{z^2-2z}{(z+1)^2(z^2+4)}$ at all its poles. b) Evaluate $\int_C \frac{dz}{z^2+4}$ , where $C$ is $ z-i =2$ in the positive orientation.	10
3.	Using contour integration, evaluate the real integral $\int_0^\infty \frac{dx}{(x^2+4)^3}$	10
✓ 4.	Evaluate $A^8 - A^7 + 5A^6 - A^5 + A^4 - A^3 + 6A^2 + A - 2I$ if $A = \begin{bmatrix} 1 & 2 & -2 \\ 2 & 5 & -4 \\ 3 & 7 & -5 \end{bmatrix}$ .	10
✓ 5.	Solve $Ax = b$ , where $A = \begin{bmatrix} 4 & 1 & 1 & -2 \\ -4 & 0 & -1 & 4 \\ -12 & -1 & 4 & 5 \\ 0 & 0 & 14 & -7 \end{bmatrix}$ and $b = \begin{bmatrix} -7 \\ 8 \\ 0 \\ -49 \end{bmatrix}$ using Gauss elimination method.	10

Half