	SRM Institute of Science and Technology	
	Kattankulathur	
	DEPARTMENT OF MEATHEMATICS	
	18MAB102T ADVANCED CALCULUS & COMPLEX ANALYSIS	
	UNIT –V Taylor's & Laurent' series, Singularity, Poles and Residue	
	Tutorial Sheet -2	

Sl.No.	Questions	Answer
	Part – A	
1	State Taylor's and Laurent's Theorem.	
2	Obtain Taylor's series of $f(z) = \dfrac{z-1}{z^2}$ in powers of $z-1$.	
3	Obtain Laurent's series of $f(z) = \dfrac{1}{z(z-1)}$ in $|z| < 1$ and $|z| > 1$.	
4	Find the residue of $\dfrac{e^z}{z^8}$.	$\dfrac{1}{7!}$
5	Find the residue of $\dfrac{1-\cos z}{z^3}$.	1
	Part – B	
6	Expand $f(z) = \dfrac{z^2-1}{(z+2)(z+3)}$ in the region: (i) $|z| < 2$ (ii) $2 < |z| < 3$ (iii) $|z| > 3$.	
7	Expand $f(z) = \dfrac{7z-2}{(z+1)z(z-2)}$ in the region $1 < z+1 < 3$.	
8	Expand $f(z) = \dfrac{1}{(z-1)(z-2)}$ in the region: (i) $|z| < 1$ (ii) $1 < |z| < 2$ (iii) $|z| > 2$.	
9	Find the residue at each pole of $f(z) = \dfrac{z^2}{(z-1)^2(z+2)}$.	$\dfrac{4}{9}, \dfrac{5}{9}$
10	Find the residue of $\tan z$.	-1

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