
	SRM Institute of Science and Technology Kattankulathur		
	DEPARTMENT OF MATHEMATICS		
	18MAB201T-TRANSFORMS AND BOUNDARY VALUE PROBLEMS		
	UNIT-V		
	Z-Transforms Tutorial Sheet -2		
Sl.No.	Questions	Answer	
Part -A			
1	Find the z-transform of $\cos\left(\frac{n\pi}{2}\right)$.	$\frac{z^2}{z^2 + 1}$	
2	Find the z – transforms of $\sin^3\left(\frac{n\pi}{6}\right)$	$\frac{3z}{4(z^2 - z\sqrt{3} + 1)} - \frac{z}{4(z^2 + 1)}$	
3	Find the z – transforms of $3n - 4\sin\left(\frac{n\pi}{4}\right) + 5a$	$\frac{(3 - 5a)z}{(z - 1)^2} - \frac{2\sqrt{2}z}{z^2 - \sqrt{2}z + 1}$	
4	Use initial value theorem to find $f(0)$ when $F(z) = \frac{ze^{aT}(ze^{aT} - \cos(bT))}{z^2e^{2aT} - 2ze^{aT}\cos(bT) + 1}$	$f(0) = 1$	
5	Use final value theorem to find $f(\infty)$ when $F(z) = \frac{Tze^{aT}}{(ze^{aT} - 1)^2}$.	$f(\infty) = 0$	
Part -B			
6	Find the inverse z – transforms of (i) $\frac{z^2 + z}{(z - 1)^2}$, (ii) $\frac{2z^2 + 4z}{(z - 2)^2}$ by long division method.	(i) $f(n) = 2n + 1$ (ii) $f(n) = n^2 2^n$	
7	Find the inverse z – transform of $\frac{1 + 2z^{-1}}{1 - z^{-1}}$ by long division method.	$f(n) = 1 + 2U(n - 1)$	
8	Find the inverse z – transform of $\frac{5z}{(2z - 1)(z - 3)}$ by partial fraction method.	$f(n) = 3^n - \frac{1}{2^n}$	
9	Find the inverse z – transform of $\frac{z^2 + 2z}{(z - 1)(z - 2)(z - 3)}$ by partial fraction method.	$f(n) = \frac{3}{2} - 4 \cdot 2^n + \frac{5}{2} \cdot 3^n$	
10	Find $Z^{-1}\left\{\frac{4 - 8z^{-1} + 6z^{-2}}{(1 + z^{-1})(1 - 2z^{-1})^2}\right\}$ by the method of partial fraction.	$f(n) = 2(-1)^n + 2 \cdot 2^n + n \cdot 2^n$	