

## Tutorial No. 4

**Class: SE SEM III**

**Subject: AM-III**

Find the Z transform of the following and find its region of convergence on z-plane.

1.  $f(k) = \begin{cases} (-2)^k & k < -1 \\ 2^{-k} & k \geq -1 \end{cases}$

2.  $3^{|k+1|}$

3.  $\cos \alpha k$ ,  $k \geq 0$

4.  $c^k \sin \alpha k$ ,  $k \geq 0$

5.  $\sinh 2k$ ,  $k \geq 0$

6.  $2^k \cosh 3k$ ,  $k \geq 0$

7.  $\sin(3k+5)$ ,  $k \geq 0$

8.  $\frac{(-1)^k}{(2k+1)!}$ ,  $k \geq 1$

9.  $\frac{k}{k-1}$ ,  $k \geq 1$

Find the inverse z transform in the given region of convergence.

10.  $\frac{z^2}{z-a}$ , i)  $|z| > |a|$  ii)  $|z| < |a|$

11.  $\frac{z+1}{(z-2)^2}$ , i)  $|z| > 2$  ii)  $|z| < 2$

12.  $\frac{1}{(z+a)^2}$ , i)  $|z| > |a|$  ii)  $|z| < |a|$

13.  $\frac{1}{(z-1)^3}$ , i)  $|z| > 1$  ii)  $|z| < 1$

14.  $\frac{z+1}{z^2-2z+1}$ , for (i)  $|z| > 1$  (ii)  $|z| < 1$

15.  $\frac{1}{z^2-5z+6}$  for i)  $|z| < 2$  ii)  $2 < |z| < 3$  iii)  $|z| > 3$

16.  $\frac{2z-3}{z^2-3z-4}$  for i)  $|z| < 1$  ii)  $1 < |z| < 4$  iii)  $|z| > 4$