

THAPAR INSTITUTE OF ENGINEERING TECHNOLOGY

(Deemed to be University)

Department of Electronics and Communication Engineering

Tutorial Sheet -8

Signals & Systems–UEC404

1. Compute the z-transform of $x(n) = r^n \cos(n\theta)u(n)$, using multiplication property.
2. Evaluate the convolution of a unit step function $u(n)$ with itself using z-transform.
3. Find the inverse z-transform of
$$X(z) = \frac{z+0.2}{(z+0.5)(z-1)} \text{ with } |z| > 1,$$
4. $\frac{z}{(z-3)(z-4)}$ with $|z| < 3$
5. Find the inverse z-transform of $X(z) = \frac{z(z^2+4z+5)}{(z-3)(z-1)(z-2)}$ for ROC (i) $2 < |z| < 3$, (ii) $|z| > 3$, (iii) $|z| < 1$
6. Check whether the corresponding LTI system with system function
$$H(z) = \frac{-(z^2 + 0.4z)}{z^2 - 2.8z + 1.6}$$

Is stable and causal, if the ROC is

 - (a) $|z| > 2$
 - (b) $|z| < 0.8$
 - (c) $0.8 < |z| < 2$
7. Determine the pole-zero plot for the system described by difference equation

$$y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) = x(n) + x(n-1)$$