

St. Joseph's College of Engineering, Chennai-119

St. Joseph's Institute of Technology, Chennai-119

Department of Mathematics

MA6351-Transforms and Partial Differential Equations

Assignment –III

UNIT V Z – TRANSFORMS AND DIFFERENCE EQUATIONS

YEAR-II

(Common to all Branches)

Semester III

Part-A

1. Find $Z(n)$.
2. State initial and final value theorem of Z - transform.
3. Find the Z- transform of unit impulse function
4. Form the difference equation from $y_n = A.2^n + B.3^n$
5. Find Z Transform of $Z\left(\frac{1}{n!}\right)$.
6. If $Z[f(n)] = U(z)$ then find $Z[a^n f(n)]$
7. Find $Z^{-1}\left[\frac{z}{(z-1)(z-2)}\right]$
8. Find $Z\{\sin at\}$

Part-B

- 1.(a) (i) Find $Z(r^n \cos n\theta)$ (ii) Find $Z\left(\cos \frac{n\pi}{2}\right)$
(b) Find the inverse Z-Transform of $\frac{z(z+1)}{(z-1)^3}$ by residue method.
- 2.(a) Find $Z^{-1}\left[\frac{z}{(z+1)(z-1)^2}\right]$ using the method of partial fraction.
(b) Find $Z^{-1}\left[\frac{8z^2}{(2z-1)(4z-1)}\right]$ by convolution theorem.
- 3.(a) Find $Z[n(n-1)(n-2)]$.

(b) Solve $y(n+3) - 3y(n+1) + 2y(n) = 0$, **given that** $y(0) = 4, y(1) = 0, y(2) = 8$

Using Z-transform.

4. (a) Solve $y_{n+2} - 5y_{n+1} + 6y_n = 5^n$, $y(0) = 0, y(1) = 0$ **using Z-transform.**

(b) Find the Z-transform of $\frac{1}{n(n+1)}$, *for* $n \geq 1$