

ST. JOSEPH'S COLLEGE OF ENGINEERING, CHENNAI-119
ST. JOSEPH'S INSTITUTE OF TECHNOLOGY, CHENNAI-119
SUB NAME & CODE: TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS-MA6351
ASSIGNMENT-IV
UNIT-V Z-TRANSFORMS AND DIFFERENCE EQUATIONS

PART-A

1. What is the Z- transform of discrete unit step function?
2. Find $Z\left\{\frac{1}{n!}\right\}$.
3. Find $Z\left\{e^{-2t} \sin 2t\right\}$
4. State Initial and Final value theorem of Z - transform.
5. Find $Z(n)$.
6. Find $Z[a^{n+3}]$.
7. If $Z[f(n)] = U(z)$ then find $Z[a^n f(n)]$
8. Form the difference equation from $y_n = A.2^n + B.3^n$.

PART-B

1. a). Solve $y(n+3) - 3y(n+1) + 2y(n) = 0$, given that $y(0) = 4, y(1) = 0, y(2) = 8$ Using Z-transform.
- b). If $U(z) = \frac{2z^2 + 3z + 12}{(z-1)^4}$, find u_2 and u_3 .
- 2.a). Find $Z^{-1}\left[\frac{z}{(z+1)(z-1)^2}\right]$ using the method of partial fraction.
- b). Find $Z(r^n \cos n\theta)$ and hence deduce $Z\left(\cos \frac{n\pi}{2}\right)$
- 3.a). Find the inverse Z-Transform of $\frac{z(z+1)}{(z-1)^3}$ by residue method.
- b). Form the difference equation corresponding to the family of curves $y_n = an + b2^n$.
- 4.a). Using Convolution Theorem find the inverse Z-Transform of $\frac{z^2}{(z-a)(z-b)}$
- b). Solve $u_{n+2} - 5u_{n+1} + 6u_n = 4^n$, given that $u_0 = 0, u_1 = 1$