School of Basic Sciences

Department of Basic Sciences
Mid Term Examination

Exam Date: 05 Oct 2023
Time : 90 Minutes
Marks : 50

Sem V - C1UC502T - Transforms and Calculus of variation

Your answer should be specific to the question asked
Draw neat labeled diagrams wherever necessary

1)	Define unilateral series.	K2	(2)
2)	Explain the Fast Fourier transform with an example.	K1	(3)
3)	Determine the inverse Z –Transform $e^{\frac{-3}{z}}$.	K2	(4)
4)	Discuss the Z –Transform of $(-3)^n$.	K2	(6)
5)	Using Convolution find $Z^{-1}[\frac{z^2}{(z-2)(z-3)}]$	K3	(6)
6)	Find the extremal of the functionals $\int_0^{\frac{\pi}{2}}(y'^2 - y^2 + 2xy)dx$ with y($\frac{\pi}{2}$)=0 and y(0)=0	K3	(9)
7)	Show the Fourier transform of the function $f(t) = e^{-a\|t\|}, -\infty < t < \infty,\ a > 0$	K4	(8)
8)	Find the extremals $\int_0^{2\pi}[(\frac{dy}{dx})^2 - y^2]dx$ **OR**	K4	(12)
	Write the extremal of the functional $\int_{x_0}^{x_1}(x^2 - y''^2 + 16y^2)dx$	K4	(12)