



Course : B.Tech (ECE)

Class Nbrs : VL2023240102254, 56, 58, 60, 62.

Slot : B2+TB2

Course Type : ETH

Course Mode: CBL

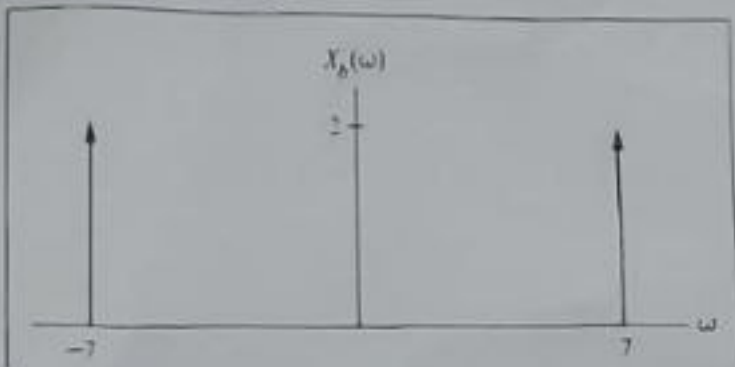
Date : 16th, October 2023

Marks : 50

Duration : 90 Min

Faculty: MALAYA KUMAR HOTA, S KALAIVANI, SUDHAKAR M S, YEPUGANTI KARUNA, ASHISH P

Each Question carries 10 marks

Q.No	Question	Marks	CO	BL
1.	(i) Evaluate the DTFS representation for the signal, $x[n] = \sin\left(\frac{4\pi}{21}n\right) + \cos\left(\frac{10\pi}{21}n\right) + 1$ (ii) Find the signal corresponding to the following Fourier transform shown in Fig.1.  Fig.1	5+5	CO3	L3
2.	Consider a signal $x(t)$ with Fourier Transform $X(\omega) = \frac{3}{4+\omega^2}$. Determine the following without actually evaluating $x(t)$. The operation $F[.]$ denotes the Fourier Transform i. $F[x(t-3)]$ ii. $\left[\frac{d}{dt}x(2t)\right]$	10	CO3	L3
3.	Using the properties of discrete time Fourier transform, find the inverse DTFT of $Y(e^{j\omega}) = \frac{1-\frac{1}{4}e^{-j\omega}}{(1+\frac{1}{2}e^{-j\omega})^2}$.	10	CO3	L3
4.	Consider the system described by $y(n] = 0.5y(n-1) + x(n]$. Find its impulse response. Also find its response for the input $x(n] = 4u(n]$.	10	CO3	L3
5.	(a). A signal $x(t) = \cos(200\pi t) + 2\cos(320\pi t)$ is ideally sampled at $f_s = 300$ Hz. If the sampled signal is passed through an ideal low-pass filter with a cutoff frequency of 250 Hz, what are the frequency components which will appear at the output? (b). Find the Nyquist sampling rate and the Nyquist sampling interval for the given signal : $\text{Sinc}^2(100\pi t)$	10	CO4	L3

