



R22 Regulation **Subject code: 4E5BC**
TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech V Semester Regular Examinations, December 2024

DIGITAL SIGNAL PROCESSING

(EEE)

Maximum Marks: 60

Date:03.01.2025

Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A		CO	Bloom Tx
All the following questions carry equal marks (10X1M=10 Marks)			
1.a)	Define LTI System.	1	L1
b)	How to check the stability of a system with respect to Z transform	1	L2
c)	What is the difference between linear convolution and circular convolution.	2	L1
d)	What are the properties of twiddle factor	2	L1
e)	What are the advantages of digital filter	3	L2
f)	What is the difference between IIR and FIR Digital filter.	3	L2
g)	What is frequency response.	4	L2
h)	What are the general characteristics of windowing functions to design FIR filters	4	L1
i)	Define interpolator.	5	L1
j)	Define sampling.	5	L2
Part-B			
Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
2	Check for following systems are linear, causal, time in variant, stable, static i) $y(n)=x(2n)$ ii) $y(n)=\cos(x(n))$ [10M]	1	L4
OR			
3	a) Find the Z-transform of unit step, ramp and impulse signals. [5M] b) Explain about ROC. [5M]	1	L2
4	Find the DFT of a Sequence $x(n)=\{8,7,6,5,4,3,2,1\}$ using radix-2 DIT FFT Technique [10M]	2	L5
OR			
5	Perform linear convolution for the input $x(n)=[2,4,-2,5,6,0,3,4,1,2,2,1]$ and Impulse response $h(n)=[3,1,2]$, using Overlap add method [10M]	2	L4
6	Explain Bilinear transformation. [10M]	3	L2
OR			
7	The analog transfer function $H(s)=2/(s+1)(s+2)$ Determine $H(z)$ using impulse invariance method [10M]	3	L4

8	Design Low pass filter with frequency response $H_d(e^{j\omega}) = 1 \quad \text{for } -\frac{\pi}{4} \leq \omega \leq \frac{\pi}{4}$ $= 0 \quad \text{for } \frac{\pi}{4} \leq \omega \leq \pi$ Using Hanning window with N=7 [10M]	4	L4
	OR		
9	Explain different types of Windows methods. [10M]	4	L2
10	With the help of block diagram explain the sampling rate conversion by a rational factor 'I/D'. Obtain necessary expressions. [10M]	5	L4
	OR		
11	a) Write a short note on Dead Band Effects. [5M] b) Explain about Round Off noise in IIR filters. [5M]	5	L2