R20 Regulation *Subject code:3P6DC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Regular/Supplementary Examinations, July2024

DIGITAL SIGNAL PROCESSING

(Electronics and Communication Engineering)

Maximum Marks: 70 Date:24.07.2024 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

	Part-A		
All the following questions carry equal marks (10X2M=20 Marks)		CO	Bloom Tx
1	What are the applications of digital signal processing?	1	L1
2	List the applications of Z – transform?	1	L1
3	Draw the general butterfly diagram of DIT.	2	L2
4	State time shifting property of DFT.	2	L3
5	List the properties of Chebyshev filter	3	L2
6	Why is the Butterworth response called a maximally flat response?	3	L2
7	What are the desirable characteristics of window?	4	L1
8	Compare FIR and IIR filters.	4	L2
9	Where is multi-rate signal processing used?	5	L2
10	What is a down sampling?	5	L1
	Part-B		
Answer All the following questions. (5X10M=50Marks)			
11	Draw the block diagram of DSP and explain. [10]	1	L2
	OR		
12	Discuss the concept of stability and ROC for the given equation. $y(n)= -0.8x(n-1)+0.6x(n-2)+y(n-1)$ [10]	1	L2
13	Explain Radix- 2 Decimation- in-Frequency FFT algorithms. [10]	2	L2
	OR		
14	Find the 4 point DFT of the given sequence $x(n)=\{1,2,3,4\}$. Find the magnitude and phase response. [10]	2	L2
15	Design a digital second order Low-Pass Butterworth filter with cut-off frequency 2.2KHz using Bilinear Transformation. Sampling rate 8 KHz. [10]	3	L3
	OR		
16	Explain the procedure for designing Analog filters using the Chebyshev approximation. [10]	3	L2

17	Explain the design procedure of linear phase FIR filter using Fourier series method. [10]	4	L2
	OR		
18	Design an ideal low pass filter whose frequency response is $H_d(e^{j\omega}) = 1$ for $-\pi/2 \leq \omega \leq \pi/2$ $= 0$ for $\pi/2 \leq \omega \leq \pi$. Find the values of h(n) for N=11. Find H(Z). [10]	4	L2
19	Explain with block diagrams how can sampling rate be converted by a rational factor I/D both in time domain and frequency domain. [10]	5	L3
	OR		
20	Explain the architecture of TMS320C54XX processor. [10]	5	L2