Regulation R18 *Subject code: 2E5BC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, February 2024

Digital signal processing

(EEE)

Maximum Marks: 70 Date: 22.02.2024 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.
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)**

		Marks	CO	Bloom Tx
1	What are the classifications of discrete signals .	02	CO1	L1
2	Find the Z-transform of $x(n)=a^n u(n)$ and its ROC.	02	CO1	L2
3	State and prove any two properties of DFT.	02	CO2	L2
4	Define DIT and DIF algorithms.	02	CO2	L1
5	What are the properties of Butterworth low pass filter.	02	CO3	L1
6	What are the advantages of impulse invariant technique?	02	CO3	L1
7	Define FIR system? What are the methods to design FIR system.	02	CO4	L1
8	Define rectangular window.	02	CO4	L1
9	What are the advantages of sampling rate conversion.	02	CO5	L1
10	What do you meant by decimation and interpolation	02	CO5	L1

Part-B

Answer All the following questions. **(5X10M=50Marks)**

11	a)Determine the impulse response of the system $y(n)-y(n-1)=x(n)+x(n-1)$	06	CO1	L3
	b) Define the following i)Continuous-time signal ii)Discrete-time signal iii)Digital signal	04	CO1	L1
	OR			
12	a) What are the applications of Z-transforms?	02	CO1	L1
	b)Derive condition for stability using Z transform and also write the properties of frequency response	08	CO1	L3
13	a) How can you obtain linear convolution from Circular convolution.	03	CO2	L3
	a) Compare overlap save method and overlap add methods	07	CO2	L2
	OR			

14	a)Draw the basic butterfly diagram for DIT and DIF algorithms.	03	CO2	L2
	b) Find the IDFT of the given signal X(k)={10,-2+2j,-2,-2-2j}by using DIF-IFFT algorithm.	07	CO2	L4
15	a) What are the advantages and disadvantages of IIR Filter	05	CO3	L1
	b) Explain spectral transformation in analog and digital domain.	05	CO3	L2
	OR			
16	a) Explain impulse invariance technique.	06	CO3	L2
	b)Derive the relationship between analog frequency and digital frequency in bilinear transformation method.	04	CO3	L3
17	Design an ideal high pass filter whose frequency response $H_d(e^{j\omega}) = 1$ for $\pi/4 \leq \omega \leq \pi$ $= 0$ for $\omega < \pi/4$. Find the values of h(n) for N=11. Find H(Z).plot the magnitude response.	10	CO4	L4
	OR			
18	a) What are the desirable characteristics of the windowing function to be satisfied in filter design?	04	CO4	L1
	b) Explain outline the steps involved in design of FIR filter using windows.	06	CO4	L2
19	a) Explain the applications of Multirate Digital signal processing.	05	CO5	L2
	b) Discuss in detail the down sampling with a neat diagram.	05	CO5	L3
	OR			
20	a)Explain the sampling rate conversion by L/M (or I/D) factor.	05	CO5	L2
	b) Explain the finite word length effects in digital filters.	05	CO5	L2