



Regulation R18

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, January 2023

Digital Signal Processing

(EEE)

Maximum Marks: 70

18-01-2023

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)

- 1 What are the applications of DSP.
- 2 Derive the z transform and write any 2 properties
- 3 What is zero padding method? What are its uses?
- 4 Distinguish between overlap add method and overlap save method
- 5 What is Warping effect?
- 6 What are the properties of chebyshev filter?
- 7 Write the differences between IIR and FIR digital filters.
- 8 What is Frequency sampling technique?
- 9 What is the need for anti-aliasing filter prior to down sampling?
- 10 What are the advantages of multirate sampling?

Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11 a) Define and explain classification of discrete time systems? 05
b) Determine the z transform and shows the ROC of the following functions 05
i) unit step ii) unit ramp iii) unit impulse

OR

- 12 a) Find the magnitude and phase response of the system described by difference equation 07

$$h(n) = \frac{1}{2} \delta(n) + \delta(n-1) + \frac{1}{2} \delta(n-2)$$

- b) What are the advantages and disadvantages of Digital signal processing. 03

- 13 a) Find the DFT of a sequence $x(n) = \{1, 0, 3, 1, 4, 3, 2, 1\}$ using DIT algorithm. 05
b) Determine the circular convolution between two sequences 05
 $x(n) = \{2, 2, 1, 3\}$, $h(n) = \{1, 1, 1, 2\}$ using matrix method.

OR

- 14 a) Find the DFT of a given signal $x(n) = \{1, 2, 2, 4\}$ by using DIF-FFT algorithm. 06
b) Derive the relationship between DFT and Z-transform. 04

- 15 Explain and derive Chebyshev filter. 10

OR

- 16 For the given specifications design an analog Butterworth low pass filter 10
 $0.9 \leq |H(j\Omega)| \leq 1$ for $0 \leq \Omega \leq 0.2\pi$
 $|H(j\Omega)| \leq 0.2$ for $0.4\pi \leq \Omega \leq \pi$
- 17 a) Explain the Frequency sampling technique to design FIR filters. 06
b) What are the advantages and disadvantages of FIR filters. 04
- OR
- 18 a) Determine the frequency response of FIR filter defined by 06
 $y(n) = 0.25x(n) + x(n-1) + 0.25x(n-2)$.
b) What is window and why it is necessary. 04
- 19 a) Explain up sampling process in time and frequency domain. 05
b) Explain limit cycle oscillations in recursive structures. 05
- OR
- 20 a) Define aliasing and explain the anti-aliasing filter specifications. 05
b) Write short notes on Dead band effects. 05