Regulation R17 *Subject code:* **1P6DC**

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Year II Semester Supplementary Examinations, June 2022
Digital signal processing
(ECE)

Maximum Marks: 70 Date:20.06.2022 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 is an LTI system.
2 Define the frequency response of a discrete-time system.
3 Define discrete Fourier series.
4 Obtain the circular convolution of the sequence x(n)={1,2,3},h(n)={1,1,1}.
5 What is meant by bilinear transformation technique.
6 Distinguish between Analog filters and Digital filters.
7 What are the disadvantages of Fourier series method.
8 What are the desirable characteristics of the window.
9 What is the need for anti-imaging filter after up sampling a signal.
10 What are the effects of Dead band.

Part-B

Answer All the following questions. (10M X 5=50Marks)

11 Explain the block diagram of DSP and its applications. [10]

OR

12 Determine the impulse response for the given system by using time response analysis

y(n)-1/6 y(n-1)-1/6 y(n-2)=x(n). [10]

13 Determine 8-point DFT of the sequence x(n)={1,1,0,0,1,1,1,0} [10]

OR

14 Find the DFT of a given signal x(n)={1,2,3,4} by using DIT-FFT algorithm. [10]

15 a)What are the advantages and disadvantages of digital filters. [5]
b)Design Butterworth low pass filter with the given specifications α_p =1dB, α_s =30dB and Ω_p=200rad/sec, Ω_s=600rad/sec.Convert this filter into digital filter by using step invariant method. [5]

OR

16 Realize the following system [10]
y(n)= -0.1y(n-1)+0.72y(n-2)+0.7x(n)-0.252x(n-2) by using
i)Direct form-I ii)Direct form-II

17 Design an ideal low pass filter whose frequency response [10]

$$H_d(e^{j\omega}) = 1 \quad \text{for } -\pi/2 \leq \omega \leq \pi/2$$

$$= 0 \quad \text{for } \pi/2 \leq \omega \leq \pi .$$

Find the values of h(n) for N=11. Find H(Z)

OR

18 a) Explain the Design of FIR digital filter by using fourier series method. [5]

b) What do you understand by linear phase response. [5]

19 a) Explain the process of decimation using relevant expressions and block diagram. [5]

b) What is the need of Multirate signal processing. [5]

OR

20 a)Compare fixed point and floating point arithmetic operations. [5]

b)Explain the methods used to prevent overflow. [5]