R18 Regulation *Subject code:2P5DC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, July 2022

DIGITAL SIGNAL PROCESSING

(ECE)

Maximum Marks: 70 Date:05.07.2022 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 are the applications of digital signal processing?
2 Find the Z-transform of $x(n)= (1/8)^n u(n)$ and its ROC.
3 State any four properties of DFT
4 What are the advantages FFT over DFT.
5 List the advantages of Butterworth filter?
6 Compare analog and digital filters.
7 Write a short note on Kaiser window sequence.
8 Define Phase delay and group delay.
9 Where is multi-rate signal processing used?
10 State the properties of ROC

Part-B

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

11 Explain the following:
i) Causal and non-causal system ii) Time Variant and Time invariant iii) BIBO
iv)Linear and non-linear systems

OR

12 a) Derive the relationship between impulse response and frequency response of a discrete time system. 5M
b) Write the applications of DSP. 5M

13 Find the DFT of the following sequence using DIF FFT? $x(n)= \{1,2,3,5,5,3,2,1\}$. 10M

OR

14 Find the DFT of the sequence $x[n]= \{1,2,1,2,1,2,1,2\}$ using decimation in time algorithm. 10M

15 What is FFT? Calculate the number of multiplications needed in the calculation of DFT using FFT algorithm with 32-point sequence. 10M

OR

16 Explain design of IIR digital filter using Impulse Invariant Techniques. 10M

17 Design an FIR Digital Low pass filter using Hanning window whose cut off frequency is 2 rad/s and length of window N=9. 10M

OR

18 Design an FIR Digital Low pass filter using Blackman window whose Cutoff frequency is 1.2 rad/s and length of window N=5. 10M

19 Explain the basic operation involved in Multirate signal processing with example. 10M

OR

20 Explain the concept of finite word length effect. Discuss limit cycles and over flow oscillations in detail. 10M