

III B. Tech II Semester Supplementary Examinations, April - 2021

DIGITAL SIGNAL PROCESSING

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **FOUR** Questions from **Part-B**

PART -A**(14 Marks)**

1. a) What are the elementary discrete time signals? [2M]
- b) How many multiplications and additions are required to compute N point DFT using radix-2 FFT? [2M]
- c) Give the magnitude function of butter worth filter. [2M]
- d) What are the advantages of Kaiser window? [3M]
- e) Distinguish between down sampling and up sampling. [2M]
- f) What are the advantages of VLIW architecture? [3M]

PART -B**(56 Marks)**

2. a) Explain the properties of ROC. [7M]
- b) For each of the following systems, determine whether or not the system is time-invariant: [7M]
 - i) $y(n) = n x(n)$; ii) $y(n) = x(2n)$; iii) $y(n) = e^{x(n)}$.
3. a) Find the DFT Coefficients for the sequence of period $N=8$ whose first four values are equal to 1 and the last four are equal to 0. [7M]
- b) State and prove any four properties of DFT. [7M]
4. a) Explain the design procedure for IIR filters using Butterworth approximations. [7M]
- b) What is warping effect? What is its effect on magnitude and phase response? [7M]
5. a) Design a high pass filter using hamming window with a cutoff frequency of 1.2 radians/sec and $N=9$. [7M]
- b) Distinguish between FIR and IIR filters. [7M]
6. a) With the help of block diagram explain the sampling rate conversion by a factor I/D . Obtain necessary expressions. [7M]
- b) What is aliasing? What is the need for anti-aliasing filter prior to down sampling? [7M]
7. a) What are the on-chip peripherals available on programmable digital signal processor and explain their functions? [7M]
- b) What is pipelining? Explain the different stages in pipelining with a diagram. [7M]
