

III B. Tech II Semester Supplementary Examinations, November -2018

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. Answering the question in **Part-A** is compulsory3. Answer any **THREE** Questions from **Part-B**

PART -A

- 1 a) Test the given system for time invariance : $y(n) = n x(n)$. [3M]
- b) State any four properties of DFT [4M]
- c) Find the Z-transform of $x(n) = (1/8)^n u(n)$ and its ROC. [4M]
- d) Draw the direct form structure of $y(n) = \sum_{k=0}^{N-1} h[k]x[n-k]$ [4M]
- e) What is the significance of Multirate Signal processing? What are the applications [3M]
- f) What are the differences between fixed point processors and floating point Processors? [4M]

PART -B

- 2 a) Find the solution to the following linear constant coefficient difference equation with initial conditions $y(-1)=4$ and $y(-2)=10$ [8M]

$$y(n) - \frac{3}{2}y(n-1) + \frac{1}{2}y(n-2) = \left(\frac{1}{2}\right)^n \text{ for } n \geq 0$$
- b) Explain the frequency domain representation of Discrete time signals [8M]
- 3 a) Given $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$, find $X(k)$ using DIF FFT algorithm. [8M]
- b) State and prove time – shifting and time scaling property of DFT. [8M]
- 4 a) Determine the ZT of $x[n] = -n a^n u[-n-1]$. [8M]
- b) What are the basic structures of FIR systems? Explain [8M]
- 5 a) What are the effects of windowing? Comparing various windowing techniques. [8M]
- b) Design a High Pass FIR filter whose cut-off frequency is 1.2 radians/sec and $N = 9$ using Hamming Window. [8M]
- 6 a) Derive the frequency domain representation of decimator. [8M]
- b) Explain the following terms: i) Up – sampling ii) Down- sampling [8M]
- 7 a) What is MAC? Explain its operation in detail. [8M]
- b) Explain about Special addressing modes [8M]
