

(b) Using Bilinear transformation obtain $H(Z)$.

If $H(S) = \frac{1}{(S+1)^2}$ and $T = 0.1$ sec. 10,10

Section-D

8. (a) Discuss in detail direct form and cascade form realizations of FIR systems.
- (b) Discuss the different design techniques of digital filters. 10,10
9. (a) What are the advantages of representing digital systems in block diagram form ?
- (b) Explain any two IIR filter realization methods. 10,10

Roll No. :

Total No. of Questions : 9] [Total No. of Pages : 4

22663

**M.Tech. (ECE) 1st Semester
Examination, March-2021
(CBCS Scheme)**

**ADVANCED DIGITAL SIGNAL PROCESSING
Paper-MTECE21C4**

Time : Three Hours] [Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note :- Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory. All questions carry equal marks.

1. Define and explain the following terms :
- (a) Superposition principle
 - (b) Circular convolution
 - (c) Differentiate between analog and digital filters.

- (d) What are the effects of finite word length in digital filters ? 5×4=20

Section-A

2. (a) Discuss the classification of signals with examples.
- (b) What are the basic elements of Digital Signal Processing (DSP) system ? List the advantages of digital signal processing over analog signal processing. 10,10
3. Explain the frequency domain representation of sampling of any signal. Discuss the discrete time processing of continuous time signals. 20

Section-B

4. (a) Find the inverse Z-transform of the system function :

$$x(z) = \frac{z+1}{(z+0.2)(z-1)}$$

$$|z| > 1.$$

- (b) Find the Z-transform and ROC of the signal sequence :

$$S(n) = [4(2^n) - 5(3^n)] \mu(n) \quad 10,10$$

5. (a) Discuss the properties of the DFT and summarize the same.
- (b) A designer has available a number of eight-point FFT chips. Show explicitly how he should interconnect three such chips in order to compute a 24-point DFT. 10,10

Section-C

6. (a) What is an IIR Digital Filter ? Compare an IIR Filter with an FIR Filter. What are the requirements for converting a stable analog filter into a stable digital filter ?
- (b) Explain window technique for FIR filter design. 10,10
7. (a) Explain the design steps of IIR filter by Bi-linear transformation method and also discuss the warping effect.