SECTION - D

8. Determine the Direct form I and II realization for a third order IIR transfer function. (20)

$$H(z)=\frac{0.28z^2+0.319z+0.04}{0.5z^3+0.3z^2+0.17z-0.2}$$

9. Write short notes on :

(a) Effect of finite word length (10)

(b) Effects of Finite Precision arithmetic on digital filters. (10)

Roll No. .....

22663

M.Tech. 1st Semester (ECE) CBCS Scheme Examination– December, 2016

ADVANCED DIGITAL SIGNAL PROCESSING

Paper : MTECE21C4

Time : 3 hours ***Max. 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 the examination.

Note : Q. No 1 is **compulsory**. Attempt **one** question from each Section. All questions carry equal marks.

1. (a) Discuss in brief the basic elements of DSP. (5)

(b) Explain the properties of ROC of Z transforms. (5)

(c) Discuss the digital All Pass Filter. (5)

(d) Discuss the direct form I for realization of IIR systems. (5)

SECTION - A

2. Derive an expression for sampling theorem. Explain the process of reconstruction of signal from its samples. Also explain the Nyguist rate and problem associated if it is not followed. (20)

3. (a) Find the Fourier Transform of Triangular Pulse. (10)

(b) State and prove the Parseval's Theorem for Fourier Transform. (10)

SECTION - B

4. (a) Discuss the properties of Z-transform. (10)

(b) Using Long Division determine the Inverse Z-Transform of (10)

$$X[Z]=\frac{1}{1-\left(\frac{3}{2}\right)z^{-1}+\left(\frac{1}{2}\right)z^{-2}}$$

When (a) $R.O.C:|z|>1$ and (b) $R.O.C:|z|<\frac{1}{2}$

5. Given x(n) = {1,2,3,4,4,3,2,1}. Find X(k) using DITFFT algorithm. (20)

SECTION - C

6. Explain the design of IIR filter by bilinear transformation. Also explain the frequency warping effect in it. (20)

7. (a) Discuss the Window Technique for the FIR filter. What is Gibbs phenomenon in it ? How is it overcome ? (10)

(b) Design a filter with : (10)

$$Hd\left(e^{-jw}\right)=\begin{cases} e^{-j3w} & -\frac{\pi}{4}\le w\le\frac{\pi}{4} \\ 0 & \frac{\pi}{4}\le|w|\le\pi \end{cases}$$

Using a Hamming window with M = 7.