

SECTION D

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

$$H(z) = \frac{0.28z^2 + 0.319z + 0.0}{0.5z^3 + 0.3z^2 + 0.17z - 1}$$

9. Write short notes on
- (a) Effect of finite word length (10)
 - (b) Effects of Finite precision arithmetic on digital filters. (10)

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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 realization of IIR systems.

for realization of (5)

SECTION

2. Derive an expression for the reconstruction of a signal from its samples. Explain the process of reconstruction of a signal from its samples. Also explain the Nyquist rate and problem associated if it is not followed.

Sampling theorem. Also explain the associated if it is (20)

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

of Triangular (10)

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

Parseval's Theorem (10)

SECTION

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

Z-transform. (10)

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

determine the (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)

$$H_d(e^{-j\omega}) = \begin{cases} e^{-j\omega} & -\frac{\pi}{4} \leq \omega \leq \frac{\pi}{4} \\ 0 & \frac{\pi}{4} \leq |\omega| \leq \pi \end{cases}$$

Using a Hamming window with $M = 7$.