Registration No:

Total Number of Pages : 02   **M.TECH**

M.TECH 2ND SEMESTER REGULAR EXAMINATIONS, MAY 2018
ADVANCED DIGITAL SIGNAL PROCESSING
Branch: EC, Subject Code:MECPE2041
Time: 3 Hours
Max Marks : 70

PART-A   (10 X 2=20 MARKS)

1. Answer the following questions.
a) Find the z transform of x (n) =u (-n+2).   **(CO2)**
b) What do you mean by scaling properties?   **(CO1)**
c) Find the condition of stability for x (n) =A^nu(n).   **(CO2)**
d) Represent x (n) = {2, 4, 5, 0, 8) in terms of impulse response.   **(CO4)**
e) What is the total number of real addition and real multiplication is required to compute 64
    point DFT.   **(CO3)**
f) If x (n) = na^{n}u (n), find the nx (n).   **(CO3)**
g) Determine the impulse responses h(n) for the system described by second order difference
    equation.Y (n)-3y (n-1)-4y (n-2) =x (n) +2x (n-1).   **(CO4)**
h) What do you mean by twiddle factor?   **(CO2)**
i) What is the meaning of wrapping effect?   **(CO4)**
j) What are GIBBS phenomena?   **(CO1)**

PART-B   (5 X 10=50 MARKS)

Answer any five questions from the following.

2. a) Discuss the Blackman-Tukey method.   **[5] (CO1)**
    b) Develop an alternate two-stage design of the decimator by designing the
       decimation filter in the form H (z) =G (z6) F (z).   **[5] (CO4)**

3. a) State and prove the parseval's Theorem.   **[5] (CO3)**

    b) Explain the Radix 2 DIT-FFT algorithm.   **[5] (CO4)**

4.a) Evaluate the value of X (K) if x (n) = (-1)^n, 0≤ n ≤7 using DIF-FFT algorithm**.**   **[5] (CO3)**

  b) Explain about Decimation and interpolation with the help of polyphase filters**.**   **[5] (CO2)**

5.a) Discuss sampling rate conversion by a rational factor.   **[5] (CO1)**

  b) Determine the coefficient of {h (n)} of a linear phase FIR filter of length
      M=15 which has a symmetric unit sample response and a frequency   response that
      satisfies the condition

$$H_r \left(\frac{2\pi K}{15}\right) = \begin{cases} 1, k = 0,1,2,3 \\ 0, k = 4,5,6,7 \end{cases}$$ **[5] (CO2)**

6.a) Calculate the mean and variance of the auto correlation function of random signals. **[5](CO3)**

   b) Explain the architecture of TMS320C5X. **[5] (CO4)**

7.a) Find the circular convolution between $x_1(n)=\{2,1,2,1\}$ and $x_2(n)=\{1,2,3,4\}$ in time domain. **[5](CO2)**

   b) Explain the symmetric properties of DFT. **[5](CO1)**

8. Write short notes on
   a) Spectral Estimation   [5] **(CO4)**
   b) Two-channel filter banks   [5] **(CO3)**

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