

Total No. of Questions :6]

SEAT No. :

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**P33**

**Oct./ TE/ Insem. -147**

**T.E. (E&TC)**

**DIGITAL SIGNAL PROCESSING**

**(2015 Course) (Semester - I)**

*Time : 1 Hour]*

*[Max. Marks :30*

*Instructions to the candidates:*

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Assume suitable data, if necessary.

- Q1)** a) Show the mapping between analog frequencies and digital frequencies. [4]
- b) What is fold over error? And how to eliminate it? [4]
- c) Application of DSP in day to day life [2]

OR

- Q2)** a) Explain the concept of Eigen values and Eigen vector, Find the Eigen values of given matrix A as given below: [6]

$$A = \begin{bmatrix} 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 0 & 2 \end{bmatrix}$$

- b) Explain the concept of basis function [4]

- Q3)** a) Explain the cyclic property of twiddle factor for 8 point DFT. [3]
- b) Find linear convolution using overlap save method of the following sequences: [7]

$$x(n) = \{1, 2, -1, 2, 3, -2, -3, -1, 1, 1, 2, -1\} \text{ and } h(n) = \{1, 2, 3\}$$

OR

**P.T.O.**

- Q4)** a) Draw signal flow graph of radix-2 DIF FFT algorithm for  $N=4$ . [6]  
b) Write short note on DCT. [4]

- Q5)** a) Show relation between Fourier Transform and Z-Transform. [4]  
b) State and prove the convolution property of Z transform. [6]

OR

- Q6)** a) Impulse response for discrete time system is given as  $h(n)=\{1,2,3\}$  and output is given as  $y(n)=\{1,1,2,-1,3\}$ , Determine discrete time input sequence  $x(n)$  using long division method. [6]  
b) Explain how ROC is important to determine the Causality and stability of LTI discrete time system. [4]