Code No: C4501 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH I - SEMESTER EXAMINATIONS, APRIL/MAY-2012
TRANSFORM TECHNIQUES
(SYSTEMS AND SIGNAL PROCESSING)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks

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1.a) Find the inverse-Z transform of the following function:

$$H(z) = \frac{z(z+1)}{(z^2+2z+1)(z-1)}$$

b) Write the equation of inverse 2-D DFT and Prove that the 2-D DFT can be constructed from 1-D DFT.

2.a) Define Haar function and find 8x8 Haar matrix.
b) Find the Hadamard transform of the following matrix

$$\begin{bmatrix} 1 & 2 & 2 & 3 \\ 2 & 4 & 3 & 1 \\ 3 & 2 & 3 & 1 \\ 3 & 4 & 2 & 3 \end{bmatrix}$$

3.a) Define STFT and explain its properties along with its applications.
b) What is MRA? What are conditions required a function to be a scaling function?

4.a) Prove the inverse CWT exists and also write the required conditions.
b) Write about Haar, Mexican Hat wavelets.

5.a) Design an integrator with a integration factor of 2 and give its applications.
b) Draw a DWT filter bank for 2 level and explain the function of each block.

6.a) How lifting scheme is used to generate a Wavelets?
b) What is wavelet packet? How it differ from general wavelets?

7.a) Draw the block diagram of subband coding used for speech processing and explain the function of each block along with the principle of operation.
b) Explain how KL Transform is used for signal compression?

8. Write short notes on the following
a) DCT
b) Multi Wavelets.

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