R09

Code No: C4501
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I - Semester Examinations, March/April-2011
TRANSFORM TECHNIQUES
(SYSTEMS AND SIGNAL PROCESSING)

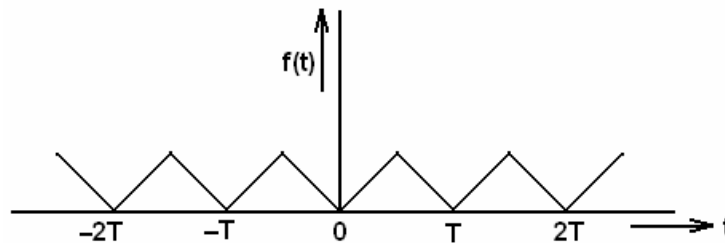**Time: 3hours**   **Max. Marks: 60**

Answer any five questions
All questions carry equal marks
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1.a)   Determine the Fourier series of the following function.

b)   Find the Inverse Z-transform of the following:
$$H(z) = \frac{z-1}{z^2 - 3z + 2}.$$ [12]

2.a)   Find DCT of the following matrix
$$f = \begin{bmatrix} x & 3 & 4 \\ 5 & 3 & 6 \\ 2 & 4 & 1 \end{bmatrix}$$

b)   Define Hoar function and write 4 x 4 Hoar matrix.   [12]

3.a)   Why wavelets are needed? What are the required conditions for a functional to be act as wavelet?
b)   What is STFT? How it related to CWT?   [12]

4.a)   What is MRA? How a function can be estimated band on MRA?
b)   Write some examples for CWT.
c)   What is scaling function? How it related to wavelet function?   [12]

5.a)   Draw the two-level filter bank structure for DWT and derive the required conditions.
b)   Explain the significance of decimation in wavelet decomposition.   [12]

6.a)   How the Bi-orthogonal pair of filters used for a function reconstruction?
b)   How multi-wavelets are used to estimate a function?   [12]

7.a)   Explain how a DCT is used for signal compression.
b)   Which transform is used for sub-band coding of speech? How?   [12]

8.   Write short notes on:
 a)   Wavelet packets
 b)   Lifting scheme.   [12]

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