# W-3313(A)

# M.A./M.Sc. (Fourth Semester) Examination, (Second Chance) June-2020

## MATHEMATICS

### Paper - 403

## Wavelets

*Time : Three Hours*
*Maximum Marks : 85 (For Regular Students)*
*Minimum Pass Marks : 29*
*Maximum Marks : 100 (For Private Students)*
*Minimum Pass Marks : 34*

**Note :** Attempt **all** questions.

Q.1.  Obtain order fast HWT for the data

$\overline{S} = (8, 6, 7, 3, 1, 1, 2, 4)$

Write the corresponding approximating function giving the significance of each Co-efficient.

Q.2.  Define the fast Daubechives Wavelet transform and obtain the matrix $D^{\Omega}$ of the same. Also show that

$$D^{\Omega^{-1}} = \left(\frac{1}{2}\right) D^{\Omega^T}$$

Q.3.  Define Fast Fourier Transform (FFT). Obtain FFT for the sample.

$\overline{f} = (3, 1, 2, 8)$

Also verify the result by obtaining inverse FFT.

Q.4.  State and prove Bessel's inequality.

Q.5.  Define an approximate identity and show that for each integrable function $f : R \to C$, continuous at $t = x$ and for each approximate identity $\{W_c : c > 0\}$.

$$f_{(x)} = \lim_{c \to 0} \int_R f(t) W_c(x - t) dt$$