**LAB -9 (THEORY)**

QUESTION – 9.1

1. As the value of N is increased the number of ripples in the spectrum increases and the width of the main lobe decreases.
2. The phase for each of the windows is linear and periodic.

|  |  |
| --- | --- |
| Type of Window(Length = 51) | Width of main lobe  (sample width/frequency width(rad/s)) |
| Rectangular | 20/0.22 |
| Bartlett | 40/0.50 |
| Hamming | 42/0.52 |
| Hanning | 40/0.52 |
| Blackman | 60/0.72 |

This samples will be converted to frequency by the formula

W = 2\*pi\*sample/500

1. For Rectangular window

We can observe that these values are nearly same for different values of N.

|  |  |
| --- | --- |
| N | Difference between heights of side lobe and main lobe |
| 51 | 13.25 |
| 75 | 13.46 |
| 101 | 13.27 |

QUESTION – 9.2

d. Comparing the levels of transition region and the side lobe levels, we observe that these levels are higher for Blackman window than for the rectangular window.

Now comparing these values to the corresponding functions in 9.1 we can say that the side lobe levels are nearly same, but the width of the transition region is larger in the compared to the observation in 9.1.

1. The new filter constructed from the filter in a, b we can say that this filter is neither a LPF nor HPF in the given interval. For smaller intervals it can act like HPF.