

Ans) Rectangular Window

$$w(n) = \begin{cases} 1; & 0 \leq n \leq M-1 \\ 0; & \text{otherwise} \end{cases}$$

Hanning Window

$$w(n) = 0.5 \left[1 - \cos \left(\frac{2\pi n}{M-1} \right) \right]$$

Hamming Window

$$w(n) = 0.54 - 0.46 \cos \left(\frac{2\pi n}{M-1} \right); \quad 0 \leq n \leq M-1$$

Kaiser Window

$$\Delta\omega = \omega_s - \omega_p$$

$$\delta = \min(\delta_1, \delta_2)$$

$$A = -20 \log_{10} \delta \quad (\text{attenuation})$$

$$\omega_c = \frac{\omega_p + \omega_s}{2}$$

cutoff frequency

$$\beta = \begin{cases} 0.1102 (A - 8.7) & ; A > 50 \\ 0.5842 (A - 21)^{0.4} + 0.07886 (A - 21) & ; 21 \leq A \leq 50 \\ 0 & ; A < 21 \end{cases}$$

$$M = \frac{A - 8}{2.285 \Delta\omega}$$

$$K = \frac{M}{2}$$

$$w(n) = \begin{cases} \frac{I_0 \left\{ \beta \left[1 - \left[\frac{n-K}{K} \right]^2 \right]^{1/2} \right\}}{I_0(\beta)} & ; 0 \leq n \leq M \\ 0 & ; \text{otherwise} \end{cases}$$