```
% Index number = 180631J
% Therefore the required parameters
A = 6;
B = 3;
C = 1;
```

Prescribed Filter specifications

```
tilde_A_p = 0.03+0.01*A;    % Maximum passband ripple
tilde_A_a = 45 + B;         % Minimum stopband attenuation
omega_p1 = C*100 + 300;     % Lower passband edge
omega_p2 = C*100 + 700;     % Upper passband edge
omega_a1 = C*100 + 150;     % Lower stopband edge
omega_a2 = C*100 + 800;     % Upper stopband edge
omega_s  = 2*(C*100 +1200); % Sampling frequency
```

Derivation of filter Parameters

```
B_t1 = omega_p1 - omega_a1; % Lower transition width
B_t2 = omega_a2 - omega_p2; % Upper transition width
B_t  = min(B_t1,B_t2);      % Critical transition width
omega_c1 = omega_p1-B_t/2;  % Lower cutoff frequency
omega_c2 = omega_p2+B_t/2;  % Upper cutoff frequency
T = 2*pi /omega_s;          % Sampling period
```

Derivation of the Kaiser Window Parameters

```
tilde_delta_p  =  (10^(0.05*tilde_A_p) -1)/(10^(0.05*tilde_A_p)  +1);
tilde_delta_a  = 10^(-0.05*tilde_A_a);
delta = min(tilde_delta_p, tilde_delta_a);
A_a = -20*log10(delta); % Actual stopband attenuation

% Choose parameter alpha as,
if A_a <=21
    alpha = 0;
elseif 21 < A_a && A_a <=50
    alpha = 0.5842*(A_a - 21)^0.4 + 0.07886*(A_a - 21);
else
    alpha = 0.1102*(A_a - 8.7);
end

% Choose parameter D as,
if A_a <= 21
    D = 0.9222;
else
    D = (A_a - 7.95)/14.36;
end

% Select the lowest odd value of N that satisfies the inequality
N = ceil(omega_s*D/B_t + 1);
if mod(N,2) ==0
    N = N+1; % If calculated N is evn, make it odd by adding 1
```

```
end

n = -(N-1)/2:1:(N-1)/2; % Range of the Kaizer window

beta = alpha*sqrt(1-(2*n/(N-1)).^2);
```