**Experiment 6**

**Filter Design using Hamming Window**

% Aim: Filter Design using Hamming Window

clc;

clear all;

close all;

rp=input('enter the passband ripple: ');

rs=input('enter the stopband ripple: ');

fp=input('enter the passband freq: ');

fs=input('enter the stopband freq: ');

f=input('enter the sampling freq: ');

wp=2\*fp/f;

ws=2\*fs/f;

num=-20\*log10(sqrt(rp\*rs))-13;

dem=14.6\*(fs-fp)/f;

n=ceil(num/dem);

n1=n+1;

if(rem(n,2)~=0)

n1=n;

n=n-1;

end

y=hamming(n1);

%low pass filter

b=fir1(n,wp,y);

[h,o]=freqz(b,1,256);

m=20\*log10(abs(h));

subplot(2,2,1);

plot(o/pi,m);

ylabel('Gain in db-->');

xlabel('(a) normalised frequency-->');

%high pass filter

b=fir1(n,wp,'high',y);

[h,o]=freqz(b,1,256);

m=20\*log10(abs(h));

subplot(2,2,2);plot(o/pi,m);

ylabel('gain in db-->');

xlabel('(b) normalised frequency-->');

%band pass filter

wn=[wp ws];

b=fir1(n,wn,y);

[h,o]=freqz(b,1,256);

m=20\*log10(abs(h));

subplot(2,2,3);plot(o/pi,m);

ylabel('gain in db-->');

xlabel('(c) normalised frequency-->');

%band stop filter

b=fir1(n,wn,'stop',y);

[h,o]=freqz(b,1,256);

m=20\*log10(abs(h));

subplot(2,2,4);plot(o/pi,m);

ylabel('gain in db-->');

xlabel('(d) normalised frequency-->');

gtext('name');

**Output:**

enter the passband ripple: .02

enter the stopband ripple: .01

enter the passband freq: 1200

enter the stopband freq: 1700

enter the sampling freq: 9000

