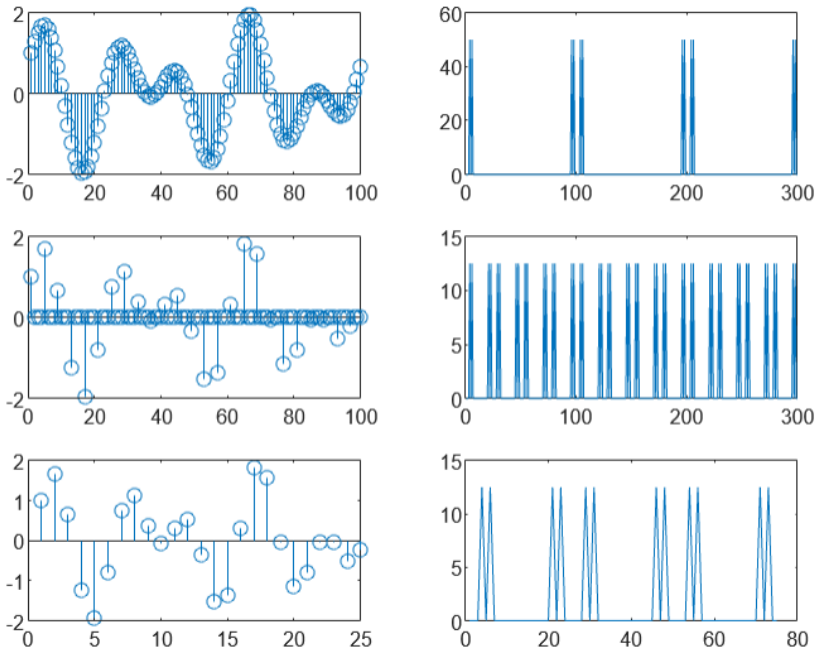
a)

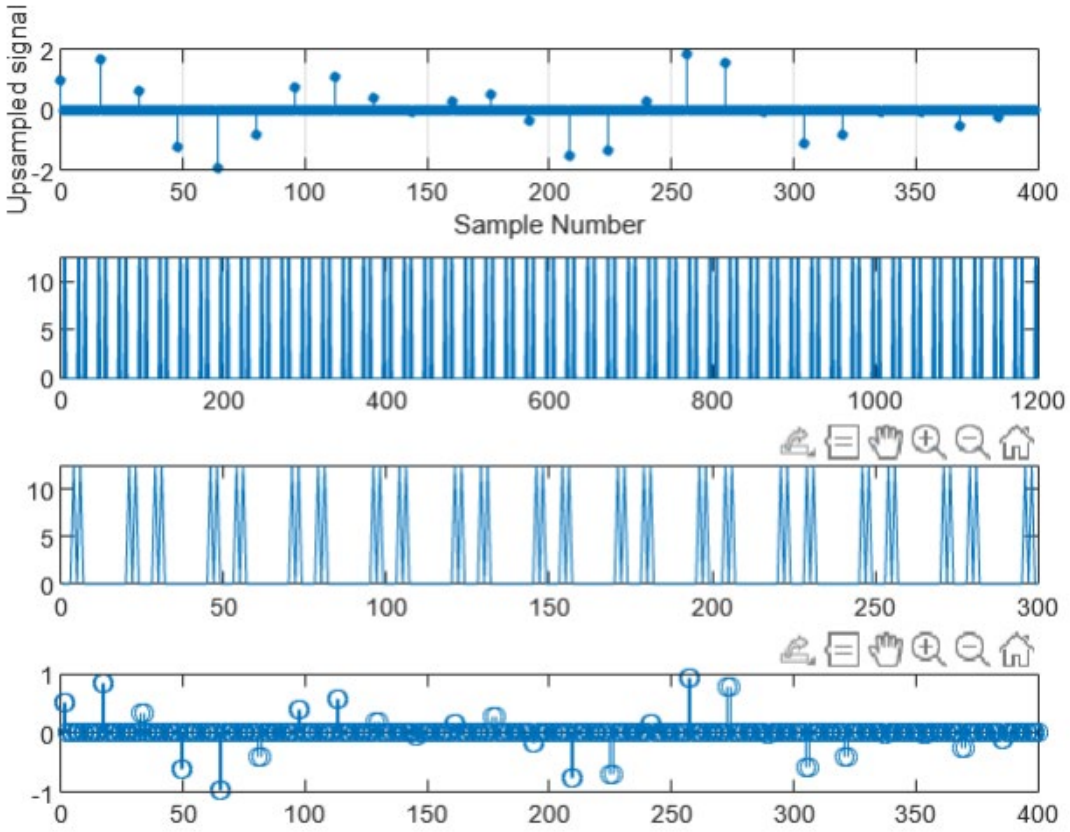


```
%% (a)
clc;
clear all;
close all;
clear workspace;


T=0.01;
fs=1/T;
t=[0:T:1-T];
x=sin(2*pi*5*t)+cos(2*pi*3*t);
figure(1)
subplot(321)
stem(x)
X=fft(x);
absX=abs(X);
subplot(322)
plot([absX absX absX]) % this plots the FT between omega=0 and omega=6pi-1/T
p=zeros(1,length(x));
p([1:4:length(x)])=ones(1,length(x)/4); %This redefines the sampling rate as 4
y=x.*p;
subplot(323)
stem(y)
Y=fft(y);
absY=abs(Y);
subplot(324)
plot([absY absY absY])
z=y([1:4:length(y)]);
subplot(325)
```

```
stem(z)
Z=fft(z);
absZ=abs(Z);
subplot(326)
plot([absZ absZ absZ])
```

b)



Was unable to get a graph that was easier to read.

```
%% (i)
z = upsample(z,16);
figure
subplot(411)
stem(0:399,z(1:400),'filled','MarkerSize',3)
grid on
xlabel('Sample Number')
ylabel('Upsampled signal')


%%(ii) Applying Fourier Transform
Z=fft(z);
absZ=abs(Z);
subplot(412)
plot([absZ absZ absZ])
```

```
%% (iii)Applying Lowpass filter with cut off frequency of 2 Hz
b=fir1(1,2/(fs/2),'low');
y=filter(b,1,z)
Y=fft(y);
subplot(413)
plot([absY absY absY])


%% (iv) Applying Inverse Fourier Transform
y=ifft(Y)
subplot(414)
stem(y);
```