**Experiment 7**

**Downsampling and upsampling of discrete time signal**

% Aim: Downsampling and upsampling of discrete time signal

clc;

close all;

clear all;

x = input('Enter the input sequence = ');

D = input('Enter the down sampling factor = ');

I = input('Enter the up sampling factor = ');

disp('input signal = ')

disp(x);

N1=length(x);

n=0:1:N1-1;

subplot(3,1,1);

stem(n,x,'k\*');

xlabel(' samples (n) -----------------> ');

ylabel('Amplitude');

title('input signal x(n)');

x2 = x(1:D:N1)

N2=length(x2);

n1=0:1:N2-1;

subplot(3,1,2);

stem(n1,x2,'k\*');

xlim([0 2\*N2]);

xlabel(' samples (n) -----------------> ');

ylabel('Amplitude');

title('Down sampled signal x(nD)');

x3=[zeros(1,I\*N1)];

n2=0:1:I\*N1-1;

j=1:I:I\*N1;

x3(j)=x

subplot(3,1,3);

stem(n2,x3,'k\*');

xlabel(' samples (n) -----------------> ');

ylabel('Amplitude');

title('Up sampled signal x(n/I)');

gtext('Name);

**Input:**

Enter the input sequence = [1 2 3 4 5 6 7 8]

Enter the down sampling factor = 3

Enter the up sampling factor = 3

**Output:**

input signal = 1 2 3 4 5 6 7 8

x2 = 1 4 7

x3 = 1 0 0 2 0 0 3 0 0 4 0 0 5 0 0 6 0 0 7 0 0 8 0 0

