Consider x(t)=cos(2πft) at sampling rates of fs1 and fs2 samples per second .Select signal frequency f ,and two different sampling frequency fs1 greater than twice of signal frequency ,fs2 less than twice of signal frequency. Solve following.

 Write down discreet signal for two different sampling rates.

1. Write down Nyquiest Rate for selected signal frequency.
2. Implement using MATLAB.
3. Compare and comment on sampling rate with respect to signal frequency.

Solution :- Given that x(t)=cos(2πft)

Let f=500

By Nyquist criteria the sampling frequency should be fs >= f

fs1=8000 Hz

fs2=800 Hz

**MATLAB Code :**

clc;clear all;close all;

A=input('Amplitude of the wave : ')

f=500

fs1=8000

fs2=800

c=input('Enter the number of cycle :')

T=c/f;

t=0:T/10000:T;

N1=(c\*fs1)/f;

n1=0:N1;

N2=(c\*fs2)/f;

n2=0:N2;

x=cos(2\*pi\*f\*t);

y=cos(2\*pi\*(f/fs1)\*n1);

z=cos(2\*pi\*(f/fs2)\*n2);

subplot(3,1,1)

plot(t,x)

title('graph for siganl frequency')

ylabel('Amplitude')

xlabel('Time')

grid on

subplot(3,1,2)

stem(n1,y)

title('graph for sampeling frequency f1 ')

ylabel('Amplitude')

xlabel('Time')

grid on

subplot(3,1,3)

stem(n2,z)

title('graph for sampeling frequency f2 ')

ylabel('Amplitude')

xlabel('Time')

grid on

**OUTPUT :**

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**Comment :**