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Q-

x(t) = sin(2*pi*fm*t);
Time period of x(t) = 4 s
i) Critical nyquist sampling
ii) oversampling(fs = 8fm)
iii) undersampling (fs = 1.5fm)

CODE-

```
clc
clear;
t=-10:0.01:10;
fm=0.25;
x=sin(2*pi*t*fm);
subplot(2,2,1);
plot(t,x)
xlabel('time')
ylabel('x(t)')
title('continuous time signal')

fs1=0.375;      %fs<2fm
n=-4:4;
x1=sin(2*pi*fm*n/fs1);
subplot(2,2,2);
stem(n,x1)
hold on
subplot(2,2,2)
plot(n,x1,':')
xlabel('n')
ylabel('x(n)')
title('discrete time signal x(n) for
fs1<2fm')
```

```matlab
fs2=0.5;      %fs2=2fm
n1=-4:4;
x2=sin(2*pi*fm*n1/fs2);
subplot(2,2,3);
stem(n1,x2)
hold on
subplot(2,2,3)
plot(n1,x2,':')
xlabel('n1')
ylabel('x2(n)')
title('discrete time signal x2(n) for
fs2=2fm')

fs3=2;      %fs3>2fm
n2=-10:10;
x3=sin(2*pi*fm*n2/fs3);
subplot(2,2,4);
stem(n2,x3)
hold on
subplot(2,2,4)
plot(n2,x3,':')
xlabel('n2')
ylabel('x3(n)')
title('discrete time signal x3(n) for
fs3>2fm')
```

OUTPUT-