DC AHP-5(a)

Name: C.P.Sindhu

SRN: PES1UG21EC071

Semester: 4th

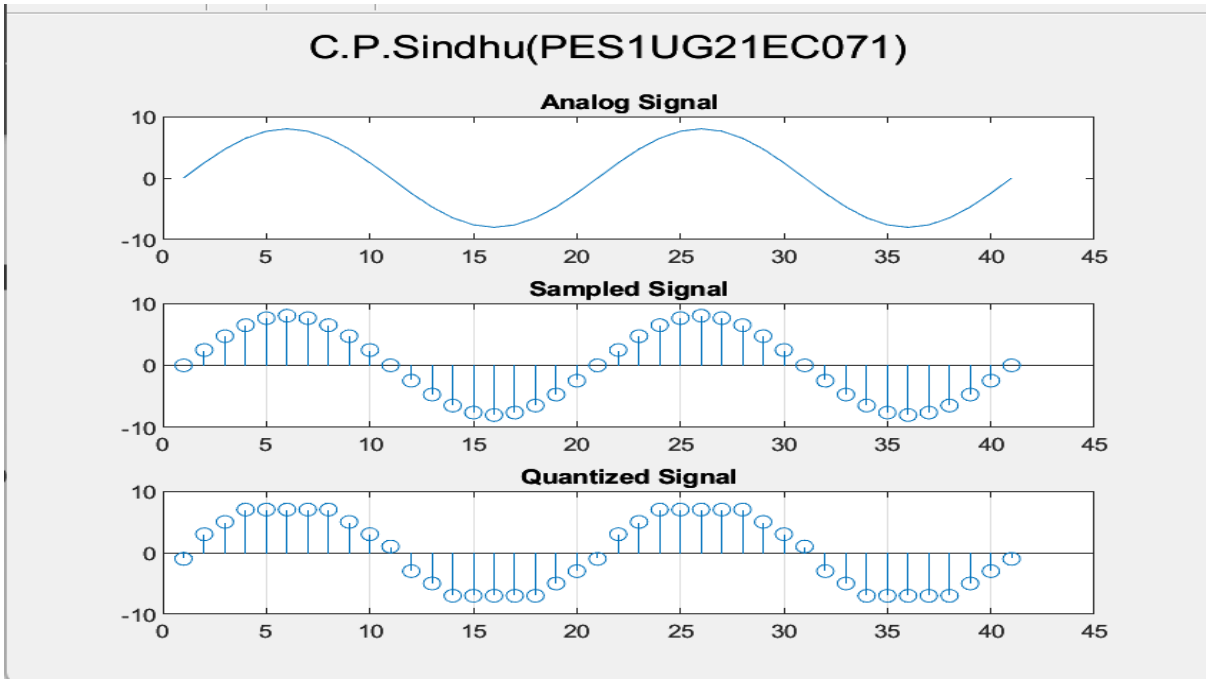
Section: 'B'

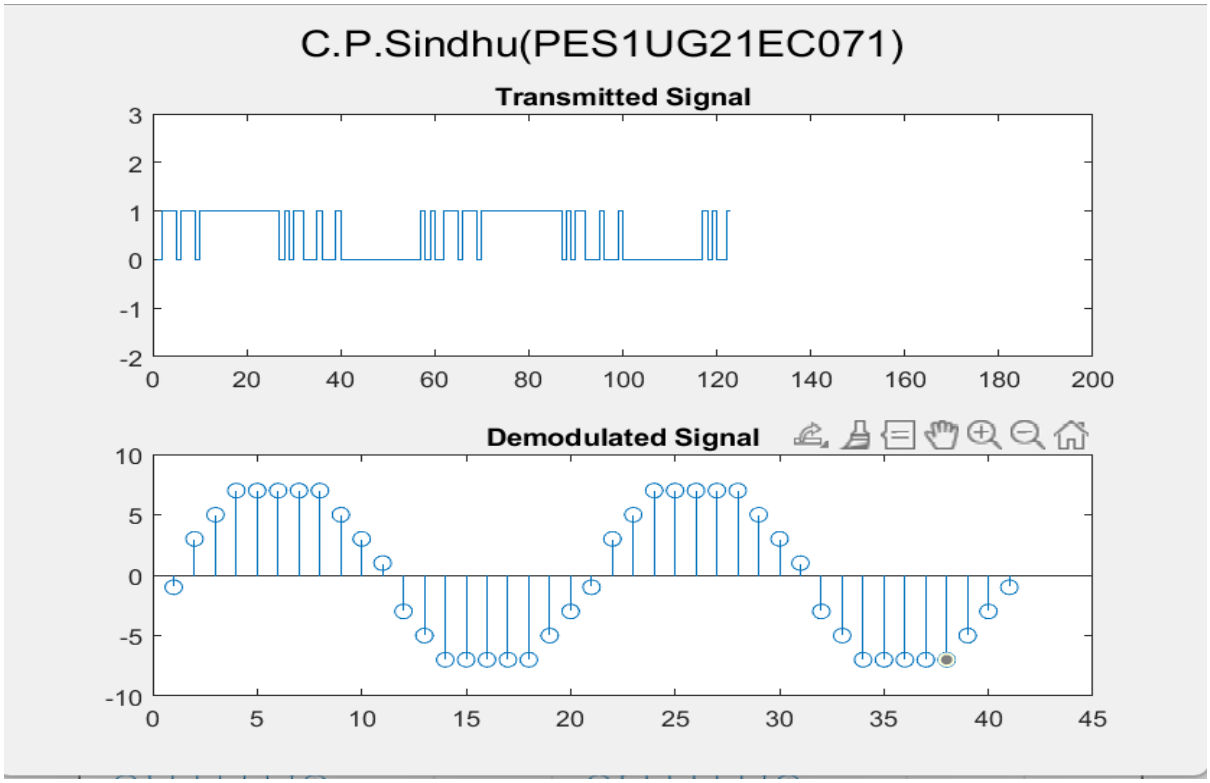
Code :

```
% Experiment 5(a): Pulse Coded Modulation (PCM) scheme

clc;
close all;
clear all;
n = 3; %n for n-bit PCM
n1 = 10; %Sampling frequency
L = 2^n; %Number of quantization levels
Vmax = 8; %Maximum voltage level
x = 0:pi/n1:4*pi;

ActualSignal = Vmax*sin(x); %Actual signal which is a sine
signal

figure;
sgtitle('C.P.Sindhu(PES1UG21EC071)');
subplot(311);
plot(ActualSignal);
title('Analog Signal');
subplot(312);
stem(ActualSignal);
grid on;
title('Sampled Signal');

Vmin= -Vmax;
StepSize = (Vmax-Vmin)/L;
QuantizationLevels = Vmin: StepSize: Vmax;
codebook = Vmin - (StepSize)/2 : StepSize:
Vmax+(StepSize)/2;
```

```
[ind,q] =
quantiz(ActualSignal,QuantizationLevels,codebook);

%Indexing begins from 1 in MATLAB, zero index is also
required
NonZeroInd = find(ind ~=0);
ind(NonZeroInd) = ind(NonZeroInd) -1 ;
BelowVminInd = find(q == Vmin-(StepSize)/2);
q(BelowVminInd) = Vmin + (StepSize)/2;

subplot(313);
stem(q);
grid on;
title('Quantized Signal');

%Encoding
figure;
sgtitle('C.P.Sindhu(PES1UG21EC071)');
TransmittedSig = de2bi(ind,'left-msb'); %Decimal to Binary
Conversion
SerialCode =
reshape(TransmittedSig',[1,size(TransmittedSig,1)*size(Tra
nsmittedSig,2)]);
subplot(211);
grid on;
stairs(SerialCode);
axis([0 200 -2 3]);
title('Transmitted Signal');

%Demodulation
ReceivedCode = reshape(SerialCode,n,length(SerialCode)/n);
index = bi2de(ReceivedCode','left-msb'); %Binary to
Decimal Conversion
q = (StepSize*index); %Convert into voltage values
q = q + (Vmin+(StepSize/2));
subplot(212);
grid on;
stem(q);
title('Demodulated Signal');
```

Output:


C.P.Sindhu(PES1UG21EC071)
Analog Signal
Sampled Signal
Quantized Signal


C.P.Sindhu(PES1UG21EC071)
Transmitted Signal
Demodulated Signal