American International University-Bangladesh (AIUB)

Course: Data Communication	Fall 2021-22, MID

Experiment 1: Introduction to MATLAB

Submitted by:

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Performance Task for Lab Report: (ID = AB-CDEFG-H)

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So,

A = 2
B = 0
C = 4
D = 2
E = 6
F = 4
G = 7
H = 1

$x_1(t) = A_1 \cos(2\pi(CDEF)t + j_1)$
$x_2(t) = A_2 \cos(2\pi(CDEF)t + j_2)$

A1 = AB = 20
A2 = GH = 71
j1 = DG = 27°
j2 = 30°

$x_1(t) = 20\cos(2\pi(4264)t + 27°)$
$x_2(t) = 71\cos(2\pi(4264)t + 30°)$

(a)

MATLAB Code:

```
A1=20;
A2=71;
j1=27*(pi/180);
j2=30*(pi/180);
t=0:pi/100:2*pi;
x1=A1*cos((2*pi*4264*t)+j1);
plot(t,x1,'m','linewidth',2);
hold on;
x2=A2*cos((2*pi*4264*t)+j2);
plot(t,x2,'r','linewidth',2);
hold on;
title("(a)");
xlabel("Time");
ylabel("Amplitude");
```
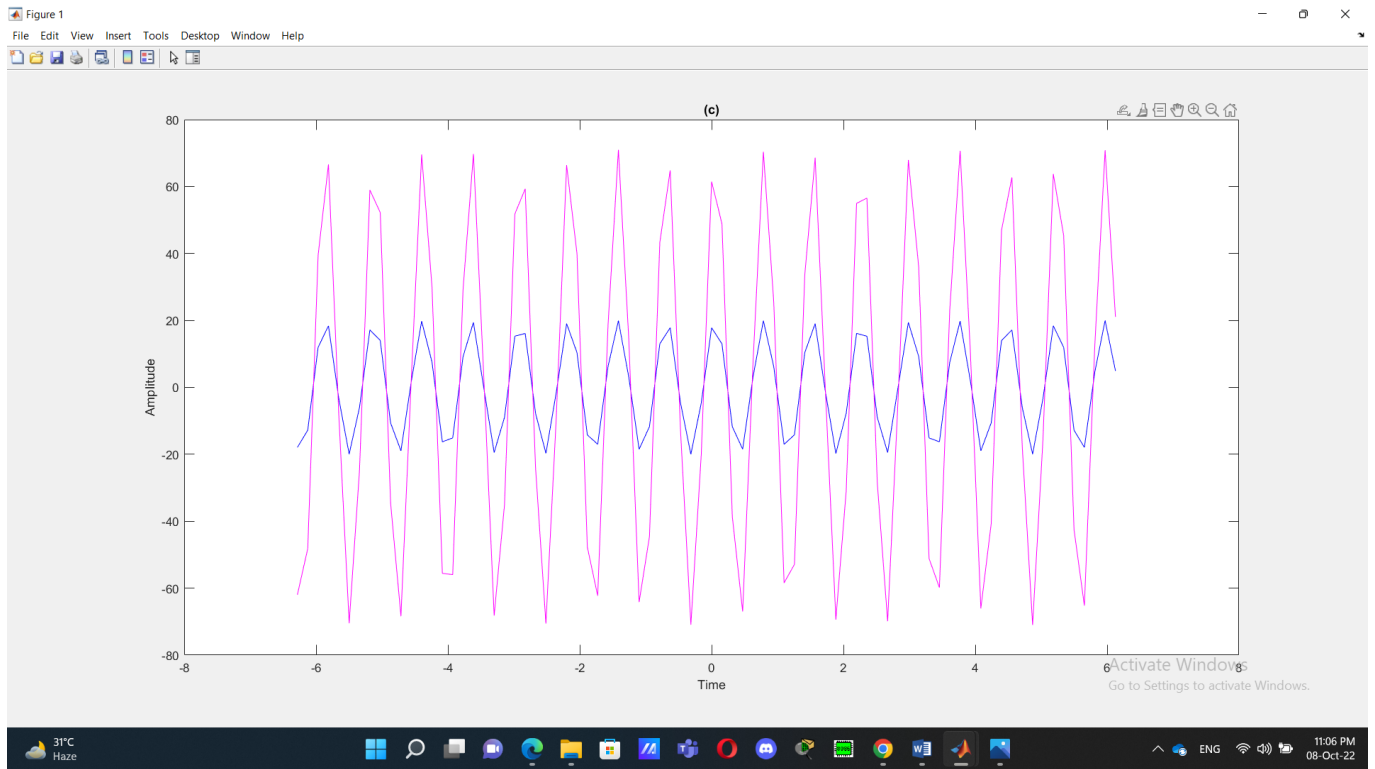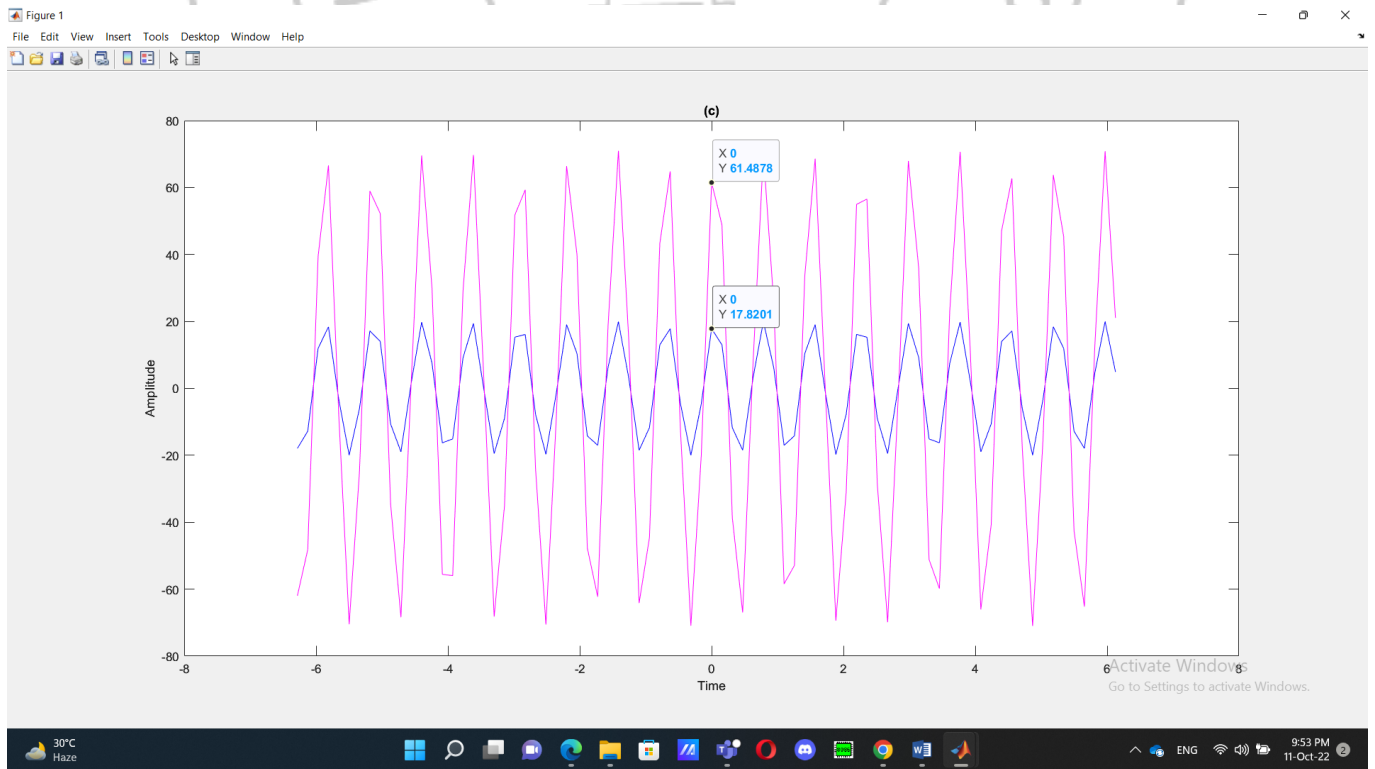
Output:

(b)

MATLAB Code:

```
A1=20;
A2=71;
j1=27*(pi/180);
j2=30*(pi/180);
t=-2*pi:pi/20:2*pi-pi/20;
x1=A1*cos(2*pi*4264*t+j1);
x2=A2*cos(2*pi*4264*t+j2);
plot(t,x1,'b',t,x2,'m')
title("(c)")
xlabel("Time")
ylabel("Amplitude")
```

Output:

(c)

Here we can see from the graph that x1(t) reaches its maximum peak after t=0 and x2(t) reaches its maximum peak at t=0.
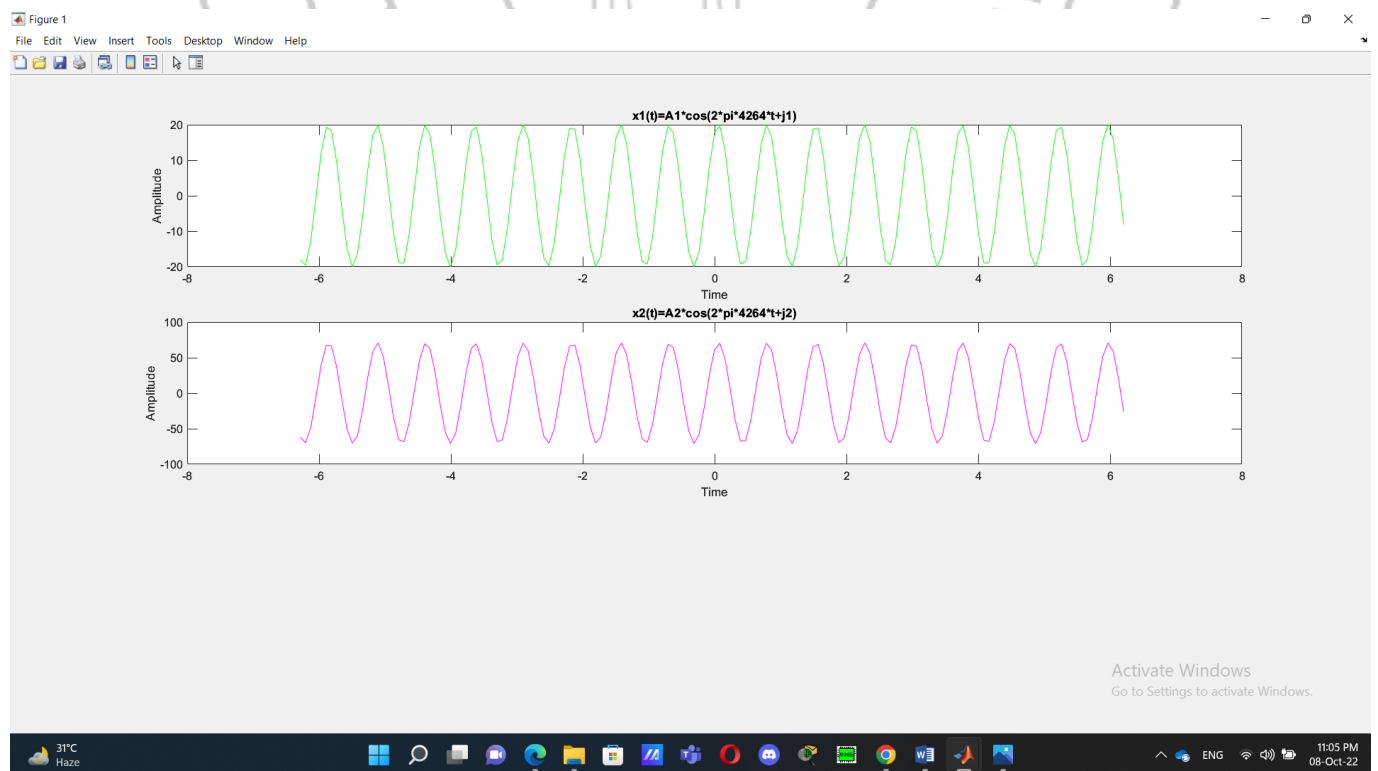
x1(t) reaches its peak A1=61.49 when t=0
x2(t) reaches its peak A2=17.82 when t=0

(d)

MATLAB Code:

```
A1=20;
A2=71;
j1=27*(pi/180);
j2=30*(pi/180);
t=-2*pi:pi/40:2*pi-pi/40;
x1=A1*cos(2*pi*4264*t+j1);
x2=A2*cos(2*pi*4264*t+j2);
subplot(3,1,1)
plot(t,x1,'g')
xlabel("Time")
ylabel("Amplitude")
title("x1(t)=A1*cos(2*pi*4264*t+j1)")
subplot(3,1,2)
plot(t,x2,'m')
xlabel("Time")
ylabel("Amplitude")
title("x2(t)=A2*cos(2*pi*4264*t+j2)")
```

Output:

(e)

MATLAB Code:

```
A1=20;
A2=71;
j1=27*(pi/180);
j2=30*(pi/180);
t=-2*pi:pi/40:2*pi-pi/40;
x1=A1*cos(2*pi*4264*t+j1);
x2=A2*cos(2*pi*4264*t+j2);
x3=x1+x2;
subplot(3,1,1)
plot(t,x1,'c')
xlabel("Time")
ylabel("Amplitude")
title("x1(t)=A1*cos(2*pi*4264*t+j1)")
subplot(3,1,2)
plot(t,x2,'k')
xlabel("Time")
ylabel("Amplitude")
title("x2(t)=A2*cos(2*pi*4264*t+j2)")
subplot(3,1,3)
plot(t,x3,'m')
xlabel("Time")
ylabel("Amplitude")
title("x3(t)=x1(t)+x2(t)")
```

Output: