Experiment No: 01
Experiment Name: UNIT IMPULSE SIGNAL

```
t1=-1:0.001:1;
impluse=[zeros(1,1000),
ones(1,1),zeros(1,1000)];
subplot(2,2,1);
plot(t1,impluse);
xlabel('time-->');
ylabel('amplitude-->');
title('UNIT IMPULSE
SIGNAL');
axis([-1 1 0 1.5]);
%UNIT STEP SIGNAL
t2=-5:0.01:5;
step=[zeros(1,500),ones(1,5
01)];
subplot(2,2,2);
plot(t2,step);
xlabel('time-->');
ylabel('amplitude-->');
title('UNIT STEP SIGNAL');
axis([-5 5 0 1.5]);
%UNIT RAMP FUNCTION
t3=0:0.01:6;
ramp=t3;
subplot(2,2,3);
plot(t3,ramp);
xlabel('time-->');
ylabel('amplitude-->');
title('UNIT RAMP SIGNAL');
%UNIT PARABOIC SIGNAL
t3=0:0.01:6;
parabola=0.5*(t3.^2);
subplot(2,2,4);
plot(t3,parabola);
xlabel('time-->');
ylabel('amplitude-->');
title('UNIT PARABOIC
SIGNAL');
```

Experiment No: 02
Experiment Name: Generation of elementary signals in continuous time

```
t=-5:0.01:5;
width=2;
y=rectpuls(t,width);
subplot(2,2,1);
plot(t,y);
xlabel('time-->');
ylabel('amplitude-->');
title('CONTITUOUS TIME
RANTANGULAR SOGNAL');
axis([-5 5 0 1.5]);
%triangular signal
t=-5:0.01:5;
width=2;
y=tripuls(t,width);
subplot(2,2,2);
plot(t,y);
xlabel('time-->');
ylabel('amplitude-->');
title('CONTITUOUS TIME
triangular signal ');
axis([-5 5 0 1.5]);
%sinc signal
t=-5:0.01:5;
width=2;
y=sinc(t);
subplot(2,2,3);
plot(t,y);
xlabel('time-->');
ylabel('amplitude-->');
title('CONTITUOUS sinc
signal');
axis([-5 5 -0.5 1.5]);
%signum signal
t=-10:0.01:10;
width=2;
y=sign(t);
subplot(2,2,4);
plot(t,y);
xlabel('time-->');
ylabel('amplitude-->');
title('CONTITUOUS sinc
signal');
axis([-5 5 -1.5 1.5]);
```

Experiment No: 03
Experiment Name:generation of continuous time sinusoidal & Gaussian signal

```
t=-0.05:0.001:0.05;
f=100;
a=2;
yt=a*sin(2*pi*f*t);
subplot(2,1,1);
plot(t,yt);
xlabel('time-->');
ylabel('amplitude-->');
title('sinusoidal signal
');
a=3;
yt=exp(-a*t.^2);
subplot(2,1,2);
plot(t,yt);
xlabel('time-->');
ylabel('amplitude-->');
title('gaussian signal ');
```

Experiment No: 04

Experiment Name:generation of continuous time sinusoidal signal of frequency 100Hz in time duration of 100 msec

```
%with time shifting 5 sec
t=-0.05:0.001:0.05;
f=100;
a=4;
y1=a*cos(2*pi*f*t);
y2=a*cos(2*pi*f*(t-0.005));
subplot(2,1,1);
plot(t,y1);
xlabel('time-->');
ylabel('amplitude-->');
title('sinusoidal signal
');
subplot(2,1,2);
plot(t,y2);
xlabel('time-->');
ylabel('amplitude-->');
title('time shifted
sinusoidal signal ');
```

Experiment No: 05
Experiment Name: generation of unit step function using signum(sign) function

```
%u(t)=0.5sgn(t)+.5
t=-10:0.01:10;
step=0.5*sign(t)+0.5;
subplot(3,1,1);
plot(t,step);
xlabel('time-->');
ylabel('amplitude-->');
title('unit step signal
u(t)');
axis([-10 10 0 1.2]);
%y(t)=u(t-3)
y=0.5*sign(t-3)+0.5;
subplot(3,1,2);
plot(t,y);
xlabel('time-->');
ylabel('amplitude-->');
title('shiftes unit step
signal,u(t-3)');
axis([-10 10 0 1.2]);
%y(t)=u(t)- u(t-6)
y=(0.5*sign(t)+0.5)-
(0.5*sign(t-6)+0.5);
subplot(3,1,3);
plot(t,y);
xlabel('time-->');
ylabel('amplitude-->');
title('shiftes unit step
signal,u(t)-u(t-6)');
axis([-10 10 0 1.2]);
```

Experiment No: 06
Experiment Name: multiplication of two continuous time signal.

```
%x1(t)=5exp(-at);
clc;
t=0:0.001:5;
a=1.2;
x1=5*exp(-a*t);
subplot(3,1,1);
plot(t,x1);
title('First signal
x1(t)');
%x2(t)=2sin(wt);
f=1;
x2=2*sin(2*pi*f*t);
subplot(3,1,2);
plot(t,x2);
title('Second signal
x2(t)');
%Multiplication of x1(t)
and x2(t)
y=x1.*x2;
subplot(3,1,3);
plot(t,y);
xlabel('time--T');
ylabel('amplitude');
title('Multiplication of
signals y(t)');
```

Experiment No: 07
Experiment Name: Multiplication of two continuous-time signals

```
clc;
clear all;
clear all;
t=-5:0.001:5;
f1=5;
x1=sinc(t).*sin(2*pi*f1*t);
f2=1;
x2=3*cos(2*pi*f2*t).*sin(2*
pi*f2*(t+0.5));
subplot(2,1,1);
plot(t,x1);
title('multiplication of
sinc and sine signals');
subplot(2,1,2);
plot(t,x2);
xlabel('time');
ylabel('amplitude');
title('multiplication of
cosine and phase shifted
sine signals');
```

Experiment No: 08
Experiment Name: shifting and scaling operation

```
%y1=sinc(t);
t=-10:0.001:10;
y1=sinc(t);
subplot(2,2,1);
plot(t,y1);
xlabel('time-->');
ylabel('amplitude-->');
title('sinc signal');
axis([-10 10 -0.5 1.5]);
%y2=sinc(4*t);
y2=sinc(4*t);
subplot(2,2,2);
plot(t,y2);
xlabel('time-->');
ylabel('amplitude-->');
title('compressed sinc
signal');
axis([-10 10 -0.5 1.5]);
%y3=sinc(2t-5);
y3=sinc(2*[t-5]);
subplot(2,2,3);
plot(t,y3);
xlabel('time-->');
ylabel('amplitude-->');
title('shifting sinc
signal');
axis([-10 10 -0.5 1.5]);
%y4=sinc(0.5*t);
y4=sinc(0.5*t);
subplot(2,2,4);
plot(t,y4);
xlabel('time-->');
ylabel('amplitude-->');
title('expanded sinc
signal');
axis([-10 10 -0.5 1.5]);
```

Experiment No: 09
Experiment Name: Generation of elementary sequence in discrete time

```
%unit impulse sequencen=-
10:1:10;
impulse=[zeros(1,10),ones(1
,1),zeros(1,10)];
ubplot(2,2,1);

stem(n,impulse);
xlabel('Discrete time-->');
ylabel('amplitude-->');
title('unit impulse
sequence');
axis([-10 10 0 1.2]);
%unit STEP sequence
n=-10:1:10;
step=[zeros(1,10),ones(1,11
)];
subplot(2,2,2);
stem(n,step);
xlabel('Discrete time-->');
ylabel('amplitude-->');
title('unit STEP
sequence');
axis([-10 10 0 1.2]);
%unit Ramp sequence
n=0:1:10;
ramp=n;
subplot(2,2,3);
stem(n,ramp);
xlabel('Discrete time-->');
ylabel('amplitude-->');
title('unit Ramp
sequence');
%unit parabolic sequence
n=0:1:10;
parabola=.5*(n.^2);
subplot(2,2,4);
stem(n,parabola);
xlabel('Discrete time-->');
ylabel('amplitude-->');
title('unit parabolic
sequence');
```

Experiment No: 10
Experiment Name: generation of discrete time expotential sequence for various values of a

```
clc; clear all;
n=-10:1:10;
%for 0<a<1
a=0.89;
x1=a.^n;
subplot(2,2,1);
stem(n,x1);
xlabel('Discrete time-->');
ylabel('amplitude-->');
title('x1(n)--for 0<a<1');
%for a>1
a=1.22;
x2=a.^n;
subplot(2,2,2);
stem(n,x2);
xlabel('Discrete time-->');
ylabel('amplitude-->');
title('x2(n)--for a>1');
%for -1<a<0
a=-.89;
x3=a.^n;
subplot(2,2,3);
stem(n,x3);
xlabel('Discrete time-->');
ylabel('amplitude-->');
title('x3(n)--for -1<a<0');
%for a<-1
a=-1.1;
x4=a.^n;
subplot(2,2,4);
stem(n,x4);
xlabel('Discrete time-->');
ylabel('amplitude-->');
title('x4(n)--for a<-1');
```

Experiment No: 11
Experiment Name: multiplication of two discrete time siganl

```
clc; clear all;

%x1(n)=6*a*n;
n=0:0.1:5;
a=2;
x1=6*(a.*n);
subplot(3,1,1);
stem(n,x1);
title('x1(n)');
%x2(n)=6*cos(wn);
f=1.2;
x2=2*cos(2*pi*f*n);
subplot(3,1,2);
stem(n,x2);
title('x2(n)');
%multiplication of two
sequences
y=x1.*x2;
subplot(3,1,3);
stem(n,y);
xlabel('Time');
ylabel('Amplitude');
title('y(n)');
```

Experiment No: 12
Experiment Name: generate of the following discrete-time sequence

```
%x(n)=u(n+3)+5u(n-
15)+4u(n+10)
clc; clear all;

n=-20:1:20;
u=[zeros(1,20),ones(1,21)];
u1=[zeros(1,17),ones(1,24)]
;
u2=[zeros(1,35),ones(1,6)];
u2=5*u2;
u3=[zeros(1,10),ones(1,31)]
;u3=4*u3;
x=u1+u2+u3;
subplot(4,1,1);
stem(n,u1);
title('u(n+3)');
subplot(4,1,2);
stem(n,u2);
title('5u(n-15)');
subplot(4,1,3);
stem(n,u3);
title('4u(n+10)');
subplot(4,1,4);
stem(n,x);
title('x(n)');
```

Experiment No: 13
Experiment Name: Fourier transform and Inverse Fourier transform of a given sequence

```
clc; clear all; close all;
syms t;
x1=exp(-t^2);
disp('The input equation
is')
disp(x1)
X1=fourier(x1);
disp('The fourier transform
of the input equation is')
disp(X1)
x11=ifourier(X1);
disp('The Inverse Fourier
transform is')
disp(x11)
```

Experiment No: 14
Experiment Name: Fourier transform of a rectangular pulse

```
clc; clear all; close all;
syms t w
% input signal x(t)
x=2*(heaviside(t+2)-
heaviside(t-2));
% x=5;
subplot(3,1,1);
ezplot(x,[-2 2]);
axis([-2.5 2.5 0 2.5]);
% fourier transform
X=int(x*exp(-1i*w*t),t,-
5,5);
X=simplify(X);disp('The
fourier transform of x(t)
is')
disp(X)
subplot(3,1,2);
ezplot(X);
%magnitude response
Xm=sqrt((real(X).^2)+(imag(
X).^2))
subplot(3,1,3);
ezplot(Xm);
```

Experiment No: 15
Experiment Name: Fourier transform of a signal

```
clc; clear all; close all;
syms t w
% input signal x(t)
x=exp(-2*t).*heaviside(t);
subplot(3,1,1);
ezplot(x);
title('input signal')
%fourier transform
disp('The fourier transform
of x(t)is')
X=fourier(x)
X=simplify(X);
% Fourier response
subplot(3,1,2);
ezplot(abs(X));
title('Magnitude response
of Fourier transform')
subplot(3,1,3);
ezplot(atan((imag(X))/(real
(X))))
title('phase response of
Fourier transform')
```

Experiment No: 16
Experiment Name: Time scaling property of Fourier transform for sinc signal

```
clc; clear all; close all;
syms t w
a=input('Input scaling
factor')
x=sinc(2*pi*0.1*t);
X=fourier(x);
X=simplify(X);
x1=sinc(2*pi*a*0.1*t);
X1=fourier(x1);
X1=simplify(X1);
figure;
subplot(2,1,1);
ezplot(x,[-20,20]);
title('without scaling');
axis tight;
subplot(2,1,2);
ezplot(x1,[-20,20]);
title('with scaling'); axis
tight;
figure;
subplot(2,1,1);
ezplot(X,[-20,20]);
title('Fourier transformed
without scaling'); axis
tight;
subplot(2,1,2);
ezplot(X1,[-20,20]);
title('Fourier transformed
with scaling'); axis tight;
```

OUTPUT

Experiment No: 17
Experiment Name: Time scaling property of Fourier transform for rectangular signal

```
clc; clear all; close all;
syms t w
x1=heaviside(t+1)-
heaviside(t-1);
x2=heaviside(t+5)-
heaviside(t-5);
X1=fourier(x1)
X2=fourier(x2)
subplot(2,1,1);
ezplot(x1,[-10 10]);
title('rectangular
signal');
subplot(2,1,2);
ezplot(x2,[-10 10]);
title('time scaled
rectangular signal');
figure;
subplot(2,1,1);
ezplot(X1,[-10 10]);
title('fourier transform of
the rectangular signal');
axis tight;
subplot(2,1,2);
ezplot(X1,[-10 10]);
title('fourier transform of
the scaled rectangular
signal');
axis tight;
```

OUTPUT

Experiment No: 18
Experiment Name: Time shifting property of the Fourier transform

```
% Calculation: No
modification on Magnitude
spectra
clc; clear all; close all;
T=input('Enter time delay')
syms t
y=sin(.2*pi*t)/(.2*pi*t);
y1=sin(.2*pi*(t-T))/(t-T);
figure;
subplot(2,1,1);
ezplot(y,[-100 100]);
axis tight;
subplot(2,1,2);
ezplot(y1,[-100 100]);
axis tight;
Y=fourier(y);
Y1=fourier(y1);
figure;
subplot(2,1,1);
ezplot(simplify(abs(Y)),[-
10 10]);
axis tight;
title('FT of sinc signal')
subplot(2,1,2);
ezplot(simplify(abs(Y1)),[-
10 10]);
title('FT of time shifted
sinc signal')
```

Experiment No: 19
Experiment Name: Modulation property of Fourier transform

```
clc; close all; clear all;
syms t w
x1=exp(-abs(t));
x2=cos(10*t);
y=x1*x2;
subplot(2,1,1);
ezplot(y);
axis tight;
Y=fourier(y)
Yp=atan((imag(Y))/(real(Y))
)
subplot(2,1,2);
ezplot(abs(Y),[-25 25]);
title('FT Magnitude');
axis([-20 20 -0.2 1.2]);
```

Experiment No: 20
Experiment Name: Generation of the Laplace transform of signals

```
clc; clear all; close all;
syms t a w
% laplace transform of
x1(t)=texp(-at)
disp('the input signal
x1(t) is')
x1=t*exp(-a*t)
disp('laplace transform of
x1(t) is')
X1=laplace(x1)
% laplace transform of
x2(t)=cos(wt)
disp('the input signal
x2(t) is')
x2=cos(w*t)
disp('laplace transform of
x2(t) is')
X2=laplace(x2)
% laplace transform of
x3(t)=exp(-5t)
disp('the input signal
x3(t) is')
x3=exp(-5*t)
disp('laplace transform of
x3(t) is')
X3=laplace(x3)
[OUTPUT below]
```

Experiment No: 21
Experiment Name: Finding the Laplace transform of signals

```
clc; clear all; close all;
 syms t
% input signals
x=exp(-t);
y=x*cos(10*t);
% ploting of signals
subplot(2,1,1);
ezplot(x,[0,5]);
axis([0 5 0 1.1]);
title('x(t)');
subplot(2,1,2);
ezplot(y,[-1,5]);
axis([0 5 -1.1 1.1]);
title('y(t)');
% displaying the Laplace
transform
disp('laplace transformof
x(t) is')
X=laplace(x)
disp('laplace transformof
y(t) is')
Y=laplace(y)
%frequency response
Xm=abs(X);
figure;
subplot(2,1,1);
ezplot(Xm);
title('mag response of
X(S)');
Ym=abs(Y);
subplot(2,1,2);
ezplot(Ym);
title('mag response of
Y(S)');
```

[OUTPUT FIGURE]

Experiment No: 22
Experiment Name: Generation of partial fraction expansion in Laplace transform

```
clc; clear all; close all;
num=input('enter the
numerator coefficients');
den=input('enter the
denominator coefficients');
[r,p,k]=residue(num,den);
disp('residue in the
partial fraction are')
disp(r)
disp('poles of the system
are')
disp(p)
```

Experiment No: 23
Experiment Name: Time shifting property of Laplace transform

```
clc; clear all; close all;
 syms t real
 % laplace transform of the
input
disp('input signal');
x1=(t^2).*heaviside(t)
% laplace transform of the
input signal
X1=laplace(x1);
disp('laplace transform of
the input signal');
X1=simplify(X1)
% delayed input signal
disp('delayed input
signal');
x2=((t-2)^2).*heaviside(t-
2)
% laplace transform of the
delayed input signal
X2=laplace(x2);
disp('laplace transform of
the delayed input signal');
X2=simplify(X2)
```

Experiment No: 24
Experiment Name: Convolution property of Laplace transform

```
clc; clear all; close all;
syms t
x1=exp(-2*t);
x2=heaviside(t);
disp('laplace transform of
x1(t) is')
X1=laplace(x1);
X1=simplify(X1)
disp('laplace transform of
x2(t) is')
X2=laplace(x2);
X2=simplify(X2)
% convolution using Laplace
transform
Y=X1.*X2;
disp('convolution of two
signals is')
y=ilaplace(Y)
% plotting the convolution
ezplot(y)
```