Exp7.m

```
clc;
clear all;
close all;
k=input('enter the no of bits');

M = 2^k;
N = k*10^3;
k = log2(M);
a = [0:M-1]*2*pi/M;
SNRdB = [0:2:20];
sdB = SNRdB + 10*log10(k);

b = [0:M-1];
map =bitxor(b,floor(b/2));
[tt ind] = sort(map);
c = zeros(1,N);
for i = 1:length(SNRdB)
bits = rand(1,N*k,1)>0.5;

bin2DecMatrix = ones(N,1)*(2.^((k-1):-1:0)) ;
shape= reshape(bits,k,N).';

G= (sum(shape.*bin2DecMatrix,2)).';

dec = ind(G+1)-1;
ph= dec*2*pi/M;

d= exp(1i*ph);
s = d;

n = 1/sqrt(2)*(randn(1,N) + 1i*randn(1,N));

r = s + 10^(-sdB(i)/20)*n;

e = angle(r);

e(e<0) = e(e<0) + 2*pi;
c = 2*pi/M*round(e/(2*pi/M)) ;
c(c==2*pi) = 0;
cd = round(c*M/(2*pi));

f = map(cd+1);
cb = dec2bin(f,k) ;
cb = cb.';
cb = cb(1:end).';
cb = str2num(cb).';

Err(i) = size(find(bits- cb),2);
end
sBer=Err/(N*k);
tBer =(1/k)*erfc(sqrt(k*10.^(SNRdB/10))*sin(pi/8));

figure
semilogy(SNRdB,tBer,'rs-','LineWidth',2);
hold on
grid on
semilogy(SNRdB,sBer,'kx-','LineWidth',2);
legend('theory','simulation');
xlabel('SNR dB')
ylabel('Bit Error Rate')
title('BER VS SNR M-PSK')
```