

## Lab 2 Q2 Solutions

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### Q2a

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See attached LaTeX document for answers

```
clear variables;  
close all;
```

### Q2b

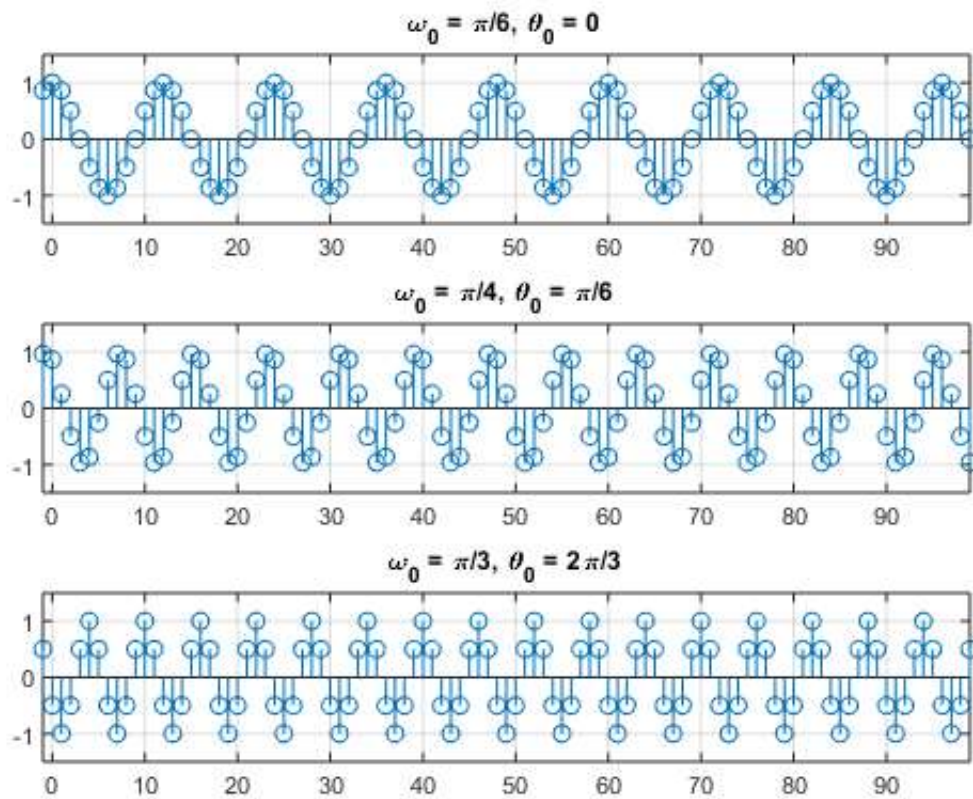
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```
w = pi/6; t = 0;  
alpha = 2*cos(w); beta = 1;  
x = zeros(1,101); x(1) = cos(w-t); x(2) = -cos(2*w-t);  
y = zeros(1, length(x) + 2);  
for i = 3:length(y)  
    y(i) = x(i-2) + alpha*y(i-1) - beta*y(i-2);  
end  
y(1:2) = [];  
y1 = y;  
  
w = pi/4; t = pi/6;  
alpha = 2*cos(w); beta = 1;  
x = zeros(1,101); x(1) = cos(w-t); x(2) = -cos(2*w-t);  
y = zeros(1, length(x) + 2);  
for i = 3:length(y)  
    y(i) = x(i-2) + alpha*y(i-1) - beta*y(i-2);  
end  
y(1:2) = [];  
y2 = y;  
  
w = pi/3; t = 2*pi/3;  
alpha = 2*cos(w); beta = 1;  
x = zeros(1,101); x(1) = cos(w-t); x(2) = -cos(2*w-t);  
y = zeros(1, length(x) + 2);  
for i = 3:length(y)  
    y(i) = x(i-2) + alpha*y(i-1) - beta*y(i-2);  
end  
y(1:2) = [];  
y3 = y;  
  
samps = -1:length(x) - 2;  
figure;  
subplot(3,1,1);  
stem(samps,y1);  
title("\omega_0 = \pi/6, \theta_0 = 0");  
axis([samps(1) samps(end) -1.5 1.5]);  
subplot(3,1,2);
```

```

stem(samps,y2);
title("\omega_0 = \pi/4, \theta_0 = \pi/6");
axis([samps(1) samps(end) -1.5 1.5]);
subplot(3,1,3);
stem(samps,y3);
title("\omega_0 = \pi/3, \theta_0 = 2\pi/3");
axis([samps(1) samps(end) -1.5 1.5]);

```



## Q2c

We simply set  $t = \pi/2$  to get the sin wave required.