# Digital Signal Processing Assignment 2

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***Abstract*—This submission is part of the assignments from the Oppenhiem Textbook of the course EE-3900 DIgital Signal Processing**

Contents



## 1 Oppenhiem 2.7-a

1) determine whether each of the signal is periodic .if the signal is periodic state the period.
   a) $x[n] = e^{j(\frac{\pi n}{6})}$

**Solution:** x[n] is said to periodic if x[n]=x[n+N] for some integer N

$$e^{j(\frac{\pi n}{6})} = e^{j(\frac{\pi}{6})(n+N)} \tag{1.1}$$

$$= e^{j(\frac{\pi}{6}n+2\pi k)} \tag{1.2}$$

$$\implies 2\pi k = \frac{\pi}{6}N$$

for some integer k,N which is satisfied for k=1 and N =12.which tells that period is 12.
so,**x[n] is periodic with period 12.**