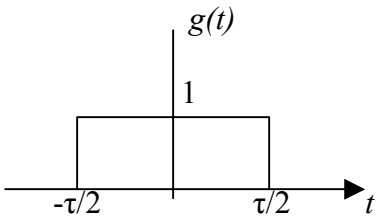
King Saud University
College of Engineering
Electrical Engineering Department

EE320 HW # 1

Q1) Draw the one-side and two-side spectrum amplitude and phase of the following signals:

a) $x(t) = \cos(2\pi 200t) + \cos(2\pi 400t + \pi/4) + \sin(2\pi 600t + \pi/4)$
b) $x(t) = 2\cos^2(2\pi 2000t) + \sin(2\pi 4000t)$

Q2) The waveform shown below is repeated every T_o seconds to have a periodic signal $g_p(t)$.



a) Derive the Fourier series coefficients of $g_p(t)$ using the complex form.
b) Draw the spectrum of $g_p(t)$, if $T_o = 2\tau$. Show only components up to $\pm 4f_o$.

Q3) The waveform $x(t) = 2\cos(2\pi f_o t) + 4\sin(6\pi f_o t) + \sin(8\pi f_o t)$ is filtered by an *RC* circuit having a transfer function $H(f) = 1/(1+jf/f_c)$ with a 3-dB cutoff frequency $f_c = 2f_o$.

a) Draw the amplitude of $H(f)$, and find out the type of this filter.
b) If $x(t)$ is applied to this filter, find out its output, and draw the spectrum of the output.