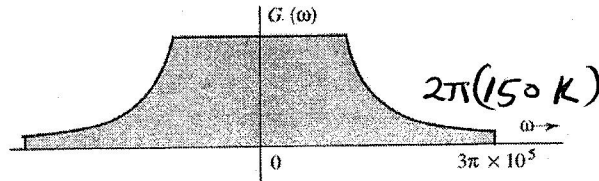


Name: KEY

The figure below shows Fourier spectrum of a signal $g(t)$



1. Determine Nyquist rate and Nyquist sampling interval for $g(t)$ (2 points)

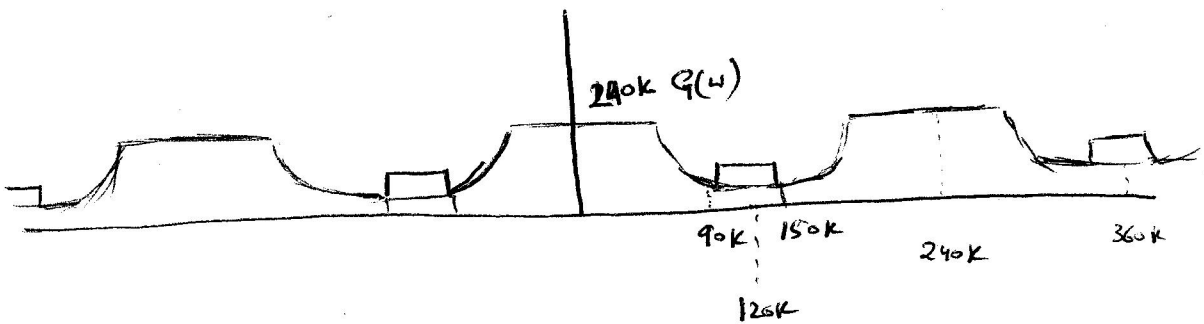
$$\text{Nyquist rate} = 2(\text{max freq}) = 300 \text{ K samples/sec}$$

$$= \text{interval} = \frac{1}{300 \text{K}} = 0.333 \times 10^{-5} = 3.333 \mu\text{sec}$$

2. Sketch the spectrum of the sampled signal, if $g(t)$ is sampled (using uniformly spaced impulses) at $0.8 \times$ Nyquist rate (4 points)

$$= (0.8)(300 \text{K})$$

$$= 240 \text{K} \quad \text{folding freq} = 120 \text{K}$$



3. Explain whether you can recover the signal $g(t)$ from the sampled signal (2 points)

We cannot recover the signal because we sampled below Nyquist Rate.

4. Determine the Nyquist sampling rate for $g^3(t)$ (2 points)

$$\text{Spectrum of } g^3(t) = 3 \text{ (spectrum BW) of } g(t) = 450 \text{K}$$

$$\text{Nyquist rate} = 2(450 \text{K}) = 900 \text{K}$$