Q1

A pulse signal $f(t)$ is periodical shown in Fig.1. Its Fourier series is given in the below form

$$F(t) = \frac{1}{2} + \sum_{n=1}^{\infty} \frac{2}{n\pi} \sin\left(\frac{n\pi}{2}\right) \cos\left(n\frac{2\pi}{T}t\right)$$
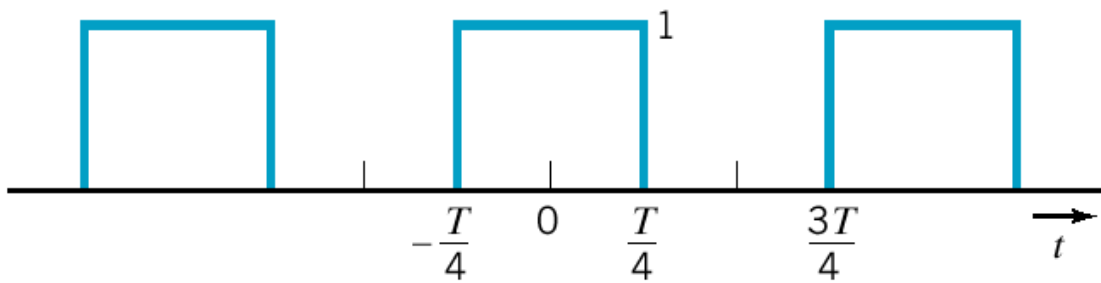
Where T is the period of signal $v(t)$ in seconds

Figure 1

a) Explain what is meant by an even or odd symmtrical signal, and determine analytically the signal $f(t)$ based on Fig 1.

[20 marks]

b) Determine the term number N with its amplitude A_N smaller than a given threshold epsilon. In other words, N can be represented in a form of epsilon. Let *epsilon* = 0.1, plot a spike diagram with the first N terms determined for the above signal using the frequemcy domain analysis.

[30 marks]