1. Express the wave function for one-dimensional harmonic waves in terms of the following parameters:

    - Frequency and wavelength
    - Period and wavelength
    - Angular frequency and wave vector

2. Consider the plane electromagnetic wave in vacuum (in SI units) given by the expressions:
   $E_x = 0$
   $E_y = 4\cos[2p * 10^{14}(t - x/c) + p/2]$
   $E_z = 0$

    - Calculate the frequency, wavelength, direction of motion, amplitude, initial phase angle, and polarization of the wave.
    - Write an expression for the magnetic flux density.

3. Write an expression for the $\vec{E}$ and $\vec{B}$ fields that constitute a plane harmonic wave traveling in the $+z$-direction. The wave is linearly polarized with its plane of vibration at 45° to the yz-plane.

4. A 500-nm harmonic EM wave, whose electric field is in the z-direction, is traveling in the y-direction in vacuum.

   - What is the frequency of the wave?
   - Determine both v and k for this wave.
   - If the electric field amplitude is 700 V/m, what is the amplitude of the magnetic field?
   - Write an expression for both $E(t)$ and $B(t)$ given that each is zero at $x = 0$ and $t = 0$. Put in all the appropriate units.

5. Consider a linearly polarized plane electromagnetic wave traveling in the $+x$-direction in free space having as its plane of vibration the xy-plane. Given that its frequency is 5 MHz and its amplitude is $E_0 = 0.05\,\mathrm{V/m}$

   - Find the period and wavelength of the wave.
   - Write an expression for $E(t)$ and $B(t)$.
   - Find the flux density, $< S >$, of the wave.

6. A light wave travels from point A to point B in vacuum. Suppose we introduce into its path a flat glass plate ($n = 1.50$) of thickness $L = 1.00$ mm. If the vacuum wavelength is 500 nm, how many waves span the space from A to B with and without the glass in place? What phase shift is introduced with the insertion of the plate?