Ques1.

A parallel plate capacitor with circular plates of radius R is driven by a harmonic voltage source of frequency ω. If $R\omega = c$, the ratio of the maximum values of electrical energy and magnetic energy is [8]

Ques2.

Consider the $\vec{E}$ and $\vec{B}$ fields associated with a He-Ne laser with 2 mW power ($\lambda = 632.8$ nm) propagating in vacuum. The beam cross-section is 0.5 mm^2. The amplitude of the electric field is [1.74] kV/m. Round off the answer to two decimal places.

Ques3.

An electromagnetic wave propagating in vacuum is described by the following expression $\vec{E} = E_0 \cos(\omega t - 300y + 400z)\hat{x}$. Assuming all quantities are in SI units, the unit propagation vector $\hat{k}$ is given by [0] $\hat{x}$ + [0.6] $\hat{y}$ + [-0.8] $\hat{z}$. The frequency in (GHz) is [23.9]. Provide all answers only up to first decimal place.

Ques4.(BONUS)

The electric field of a linearly polarized electromagnetic wave propagating in vacuum is given by $\vec{E} = E_0 \cos(\omega t - 2x + 4y - 4z)$, where the unit vector along $\vec{E}$ is $\hat{n} = \frac{1}{3}(\hat{x} + \hat{y} - \hat{z})$. The unit vector along the direction of the magnetic field is $\frac{1}{\sqrt{3}}$([0] $\hat{x}$ + [1] $\hat{y}$ + [1] Expected Solutions: **0.33** $\hat{z}$).