Question 1 ***(15 marks)***

The electric-field intensity of a uniform plane wave propagating in medium is given by

$$\vec{E} = 37.7\cos(8\pi \times 10^8 t + 0.4\pi y)\overrightarrow{a_x}\ (V/m)$$

(a) Frequency and wavelength

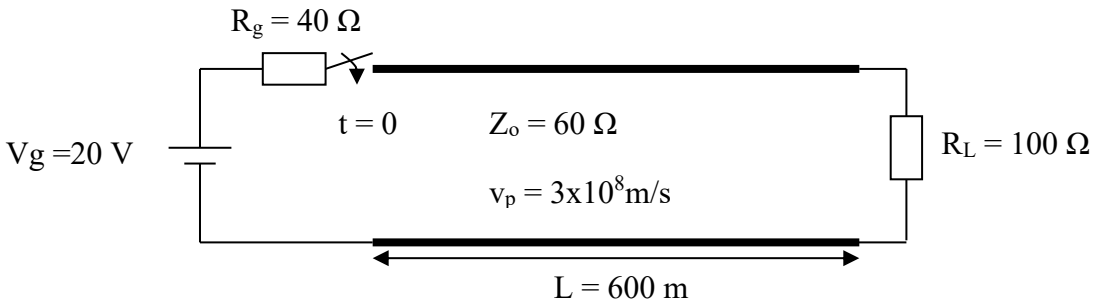
(c) The direction of propagation of the wave

(d) Associated magnetic-field intensity vector **H**

Question 2 ***(35 marks)***

In the system shown in the below figure, the switch is closed at $t = 0$.

a. Determine voltage reflection coefficient at the load and the source
b. Sketch the bounce diagram of the VOLTAGE and the CURRENT and give sufficient information on it (up to 12μs)
c. Sketch diagram of voltage and current at source: V(0,t) and I(0,t)
d. Find the value V(L,t=6us)



Question 2 ***(25 marks)***

A sinusoidally time-varying vector field is given at a point by $\vec{F} = \cos(\omega t + 45°)\overrightarrow{a_x} + \cos(\omega t + \beta)\overrightarrow{a_y}$ find the β between 0° to 360° so that:

a. The $\vec{F}$ is linearly polarized in 1st and 3rd quadrants
b. The $\vec{F}$ is circularly polarized
c. Draw diagram to show the answer in a) and b)

Question 4 ***(25 marks)***

The magnetic field of a uniform plane wave (at z = 0) propagating in the +z direction in a nonmagnetic ($\sigma = 9\ S/m, \varepsilon = 9\varepsilon_0, \mu = \mu o$) material medium is given by

$$\vec{H} = 0.1cos(2\pi \times 10^8 t)\overrightarrow{a_y} \quad \text{(A/m)}$$

a. Find α, β and propagation constant
b. Find magnitude and phase of the intrinsic impedance $\overline{\eta}$.
c. Find numeric expression of electric field.

The end – Good luck