**TRANSMISSION LINES AND WAVEGUIDES**

**UNIT-1 PROBLEMS**

1. A generator of 1V, 1 KHz supplies power to a 100 km long line terminated in Zo and having the following constants: R= 10.4 Ω/km , L= 0.00367 H/km, G=0.8 X 10-6 mho/km and C= 0.00835 X 10-6 F/km. Calculate Characteristic Impedance, Propagation Constant, Wavelength, received current and received voltage.
2. A lossless transmission line is terminated in a load impedance (30-j23) Ω. Find the phase constant and the reflection coefficient of a line of length 50 m. Characteristic impedance Z0 =50 Ω , wavelength on the line=0.45 m.
3. A lossless transmission line in a TV receiver has a capacitance of 50 pF/m and an inductance of 200 nH/m. Find the characteristic impedance, phase constant and velocity of propagation for the line at 500 MHz.
4. Impedance measurements on a transmission line operating at 5 KHz gave the following results:

Input impedance with the line open circuited ZOC=141.9 ے-84.1oΩ

Input impedance with the line short circuited ZSC=62.0 ے37.7oΩ

The length of the line is 2 Km. Find the following:

(i) Characteristic Impedance (ii) Propagation Constant (iii) Phase velocity (iv) Wavelength

1. A lossy cable which has R= 2.25 Ω/m, L=1.0 µH/m, C=1 pF/m, and G=0 operates at f=0.5 GHz. Find the attenuation constant.