Q1: Coaxial cable parameters: a = 2.5 mm, b = 5.5 mm, $\varepsilon_r = 4.5$, $\mu_r = 1$, $\sigma_d = 10^{-4}$ S/m and

$\sigma_c = 5.7 \times 10^7$ S/m.

Two-wire line: a = 3 mm, d = 2 cm, $\sigma_d = 10^{-4}$ S/m and $\sigma_c = 5.7 \times 10^7$ S/m.

1) Find the value of R, L, G, C and Z_o for the lines above. Plot γ against frequency. (f varies from 300 MHz to 5000 MHz)

2) Plot a) For co-axial cable: Plot Z_o against "a" and Z_o against "b"

b) For two wire line: Plot Z_o against "a" and Z_o against "d"

Q2: A transmission line is terminated by two kind of loads: a) $Z_L = R + jX_L$ and b) $Z_L = R - jX_L$

Line and load parameters given as $Z_o = 50\ \Omega$, R = 100 Ω, L = 1.33µH and C = 100 nF.

a) Plot $|\Gamma|$, Re (Γ) vs ω

b) Plot SWR vs ω

(f →500 MHz to 5000 MHz)

Q3: A 7 V/m plane wave whose frequency is 500 MHz, propagates in (-z) direction. The medium parameters are $\varepsilon_r = 6$ and $\mu_r = 1$, $\sigma = 10$ S/m. Write the complete expression of the electric field in time domain. Plot the phase and group velocity as a function of frequency.

(f →300 MHz to 3000 MHz)