

College of Electronic Technology/ Tripoli

Engineering Electromagnetics II

Final exam

Q.1) A lossless transmission line having $Z_o = 120 \Omega$ is operating at $\omega = 5 \times 10^8$ rad/s. If the velocity on the line is 2.4×10^8 m/s, find: (a) L ; (b) C . (c) let Z_L be represented by an inductance of $0.6 \mu H$ in series with 100Ω resistance. Find Γ and SWR . (points: 10)

.....

Q.2) If the H and E fields in air are given by $H = -0.3 \sin(4\pi \times 10^6 t - \beta z) a_x$ A/m, and $E = A \sin(4\pi \times 10^6 t - \beta z) a_E$ V/m, find β , a_k , and A . (points: 4+2+4)

.....

Q.3) In travelling from free space into a certain material at normal incident, a uniform plane wave encounters a reflection of -0.125 and a velocity reduction of 50 percent. If the material is lossless, what are ϵ_r and μ_r ? (points: 5+5)

.....

Q.4) The parameters of a certain transmission line operating at 6×10^8 rad/s are $L = 0.4 \mu H/m$, $C = 40$ pF/m, $G = 80$ mS/m, and $R = 20 \Omega/m$. Find the following:

(a) γ , α , β , λ , and Z_o (points: 10+5)

(b) If a voltage wave travels 20 m down the line, by what percentage is its amplitude reduced, and by how many degrees is its phase shifted? 10

.....

Q.5) a) Determine the dc resistance of a round copper wire ($\sigma = 5.8 \times 10^7$ mhos/m, $\mu_r = 1$, $\epsilon_r = 1$) of radius 1.2 mm and length 600 m.

b) Find the ac resistance at 100 MHz. (points: 5+5+5)

c) Calculate the approximate frequency where dc and ac resistance are equal.

.....