El-Shorouk Academy	The Higher Institute of Engineering
Computer and control engineering	
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Sheet two:Transmission lines(T.L.)

[1] Consider a T.L with $R=12m\Omega/m, G=0.8\mu\Omega^{-1}/m,$ $L=1.3\mu H/m and C=0.7\mu F/m$. For a wave frequency =5KHz. Find the following: (i) The propagation coefficient (γ).
(ii) The attenuation coefficient (α) The phase shift coefficient(β).(iii) The characteristic impedance (Z_0).(v) The attenuation in 2 km length in dB.

[2] Consider **a lossless** transmission line with $L=0.4\mu H$ and $C=0.1nF$ for a wave has frequency of 200 MHz. (i) draw it equivalent circuit diagram. Then, find the following: (i) The propagation coefficient (γ). (ii) The attenuation coefficient(α) and phase shift coefficient(β).(iii) The velocity of wave propagation(Vp).(iv)The characteristic impedance of the line(Z_0).

[3] Consider **a lossless** T.L with $L=0.6\mu H/m, C=240PF/m, f=100MHz$. Find the following: (i) The propagation coefficient (γ). (ii) The propagation Wavelength of the line (λ).(iii)The input impedance for the line with $l=\frac{\lambda}{4}$ when terminated by $Z_L=-j100\Omega$

[4] Consider **a lossless** T.L of characteristic impedance $Z_0=50\Omega$ is terminated by $Z_L=200+j200\Omega$. Find the following :(i) The voltage reflection coefficient. (ii)VSWR.(iii)The impedance for the line at 0.75λ from the load.

[5] Consider a **lossless** line with characteristic impedance $Z_0=50\Omega$.

A. Find the input impedance Z_{in} of the line at a distance $\frac{\lambda}{10}$ in the following cases :(i) Load impedance = 100Ω. (ii) Load is open circuit. (iii) Load is short circuit.

B.Determine the reflection coefficient at the load when: (i) Load impedance= $j50\Omega$.(ii) Load impedance= 100Ω.(iii) Load impedance = 50Ω. (iv) Load is open circuit. (v) load is short circuit.

[6] Consider **a** transmission line has constants $R=12m\Omega/m, G=1.4\mu\Omega^{-1}/m,$ $L=1.5\mu H/m \quad and C=1.4nF/m$ at 7KHz. Find the following :(i) The characteristic impedance(Z_0). (ii)The propagation coefficient (γ). (iii) The attenuation in 2 km length in dB.

[7] Consider **a** transmission line with characteristic impedance $Z_0 = 50\Omega$. Find the reflection coefficient (Γ) when Z_L has the following values:. (i) 100Ω. (ii) 25Ω. (iii) 50Ω.

[8] Consider **a** transmission line has $R = 30\Omega / km, L = 10mH / km,$ $G = 0 and C = 20\mu F / km$ operate at f=1 KHz. Obtain the following :(i) The characteristic impedance of the line(Z_0).(ii) The propagation coefficient (γ).(iii) The propagation phase velocity(Vp) .

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Best wishes

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