



**Arab Academy for Science & Technology
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College of Engineering & technology
Electronics & Communication Engineering Department**



EC443 EM Transmitting Media

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Problems Set #1

P1.1 The parameters of a certain transmission line operating at 6×10^8 rad/s are :
 $L=0.4 \mu\text{H/m}$, $C=40 \text{ Pf/m}$. $G=80 \text{ mS/m}$, and $R=20 \Omega/\text{m}$.

- (a) Find β , γ , α , and Z_0 .
- (b) If a voltage wave travels 20 m down the line , what percentage of the original wave amplitude remains, and by how many degrees is its phase shifted .

P1.2 A lossless transmission line having $Z_0=120 \Omega$ 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 the load impedance be represented by the inductance of $0.6 \mu\text{H}$ in series with a 100Ω resistance . Find the reflection coefficient & VSWR.

P1.3 Two characteristics of a certain lossless transmission line are $Z_0=50 \Omega$ and $\gamma= j 0.2 \pi$ 1/m at $f=60 \text{ MHz}$: (a) Find L & C for the line. (b) A load impedance has a value of $60+j80 \Omega$ is located at $z=0$. What is the shortest distance from the load to a point at which $Z_{in}=R_{in}+j0$?

HomeWork Assignment#1:

H1.1 The propagation constant of a lossy transmission line is $1+j 2$ 1/m, and the characteristic impedance is 20Ω at $\omega=1 \text{ Mrad/s}$. Find L,C,R , and G for the line.

H1.2 1.2 A lossless transmission line with $Z_0=60 \Omega$ is being operated at 60 MHz. The velocity on the line is 3×10^8 m/s. If the line is short-circuited at the $z=0$, find Z_{in} at $z=$:

- (a) -1 m; (b) -2 m; (c) -2.5 m; (d) -1.25m

Good Luck☺