

Question 1: The wavelength of a 600-MHz wave propagating through a non-magnetic dielectric is 20 cm. What is the **dielectric constant** of the material?

(solution: 6.25 F/m)

Question 2: A 3-GHz uniform plane wave propagates through rexolite medium (with  $\epsilon_r=2.54$ ,  $\mu_r=1$ ) in the positive z direction. Find the **wave length** of the wave and related **phase constant** ( $\beta$ ) (if the medium is assumed to be lossless,  $\alpha=0$ )

(solution: 62.7 mm, 100.137 rad/m)

Question 3: It is proposed to silver-plate ( $\sigma = 6.12 \times 10^7$  Mhos/m) a 3.048 meter length of stainless-steel ( $\sigma=0.11 \times 10^7$  Mhos/m) wire, so as to reduce its resistance ( $R_{AC}$ ) at 1-GHz. The wire diameter is 2-mm.

(a) Approximate the **minimum plating thickness** (of silver) required to insure that the 1-GHz signal-current in the stainless steel material is negligible.

(solution: 6.1  $\mu$ -meter)

(b) Assume sufficient plating to calculate the 1-GHz **resistance** of the wire. Compare the result to the **resistance** of the wire before plating.

(solution: 29  $\Omega$  and 3.9  $\Omega$ )