Roll No ....

EC - 8012(GS) / 8102(NGS)

B.E. VIII Semester
Examination, June 2014
Microwave Circuits
(Elective)

Time : Three Hours

Maximum Marks : 70

Note: Attempt any five questions. All the questions carry equal marks. Assume suitable data if any missing. Answer must be to the point.

1. a) A microstrip line with a ratio of line width w to dielectric thickness h of 3.5 uses a dielectric of relative permittivity 9. Calculate the effective relative permittivity, the characteristic impedance and the wavelength of the line if the frequency is 2.9 GHz.

   b) A 75 ohms microstrip line uses a dielectric of relative permittivity 9. Find the required ratio of line width w to dielectric thickness h and the effective relative permittivity.

2. Design a single stub tuner to match a load of (80 - j40) ohms to a transmission line of characteristic impedance 50 ohms.

3. Calculate the characteristic impedances for a five - section binomial multiple quarter wave transformer for matching 100 ohms transmission line to a 1000ohms line.

4. The scattering parameters of a transistor are given below. Design a complete amplifier schematic with input and output matching networks

$$S_{11} = 2.3\angle -135°$$
$$S_{12} = 0.$$
$$S_{21} = 4\angle 60°$$
$$S_{22} = 0.8\angle -60°$$

5. Design a low pass filter for fabrication using microstrip lines. The cutoff frequency is 4 GHz, and the impedance is 50ohms. Use a third order design with 3dB equal ripple passband characteristic.

6. Find the necessary local oscillator phase noise specification if an 860 MHz cellular receiver with a 30KHz channel spacing is required to have an adjacent channel rejection of 80dB, assuming the interfering channel is at the same level as the desired channel. The final IF voice bandwidth is 12kHz.

7. Write short notes on:
   a) Design procedure of Low Noise Amplifier.
   b) Losses in planar transmission line.

8. Design a four sections binomial matching transformer to match a 10 ohms load to a 50 ohms line. What is the bandwidth of this transformer for maximum reflection coefficient = 0.05.

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