M.E. Second Semester (Electronics & Tele.) (Full Time) (C.G.S.- New)

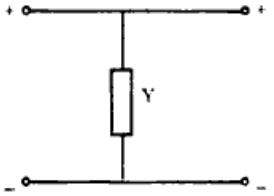
13344 : RF & Microwave Circuit Design : 2 ENTC 4

P. Pages : 2 | AU - 3468

Time : Three Hours | Max. Marks : 80

Notes :
1. Answer **three** question from section A and **three** question from section B.
2. Due credit will be given to neatness and adequate Dimensions.
3. Assume suitable data wherever necessary.
4. Illustrate your answer necessary with the help of neat sketches.
5. Use of pen Blue/Black ink/refill only for writing book.

1. a) What are the S-parameters of a Shunt element (Y) as shown in fig. 1. a. **7**



b) Explain properties of S parameters. **6**

OR

2. a) Transform ABCD parameters in terms of Y parameters. **7**

b) Transform h parameters in terms of Z parameters. **6**

3. Using the matching network topology choose the characteristic impedances of the stub and transmission line such that the load impedance ZL = (120–j20) Ω is transformed into the input impedance Zin = (40+j30) Ω. Assume that the length of transmission line is IL = 0.25 λ and the stub has the length of IS = 0.375 λ. Furthermore determine whether a short circuited or an open circuited stub is necessary for this circuit. **13**

OR

4. Design a matching network that transforms the load ZL = (30+j10) Ω to an input impedance Zin = (60+80j) Ω The matching network should contain only two series transmission lines and a shunt capacitance. Both transmission lines have a 50 Ω characteristics line impedance and the frequency at which matching is defined is f = 1.5 GHz. **13**

5. a) Explain design issues of balanced broadband amplifier. **7**

b) Derive expression for power of RF transistor Amplifier. **7**

OR

6. a) RF amplifier has **7**

$S_{11} = 0.3\angle -70°$, $S_{21} = 3.5\ \angle 85°$, $S_{12} = 0.2\angle -10°$, $S_{22} = 0.4\angle -45°$

with i/p voltage same. Zs = 40 & Assume Zo = 50. Calculate G_T, G_{TU} & G_A.

b) Explain a generic single stage amplifier configuration embedded between input and output matching networks. Also explain its parameters. **7**

SECTION - B

7. a) Explain Quartz oscillators in detail with its equivalent representation. 7

   b) A crystal is characterized by the parameter 7
   $L_q = 0.1H$, $R_q = 25\Omega$ $C_q = 0.3pF$ and $C_o = 1pF$. Determine the series and parallel resonance frequencies.

OR

8. a) Describe in brief the high frequency oscillator configuration. 7

   b) Explain voltage controlled oscillator in detail. 7

9. a) Explain the even & odd mode analysis of coupled microstrip lines. 7

   b) Explain parallel strip lines in detail. 6

OR

10. a) Explain losses in microstrip lines in detail. 7

    b) Explain double Balanced mixer design in detail. 6

11. a) Discuss the following. 8
    a) Substrate materials. b) Conductor materials
    c) Dielectric materials. d) Resistive materials.

    b) A planer resistor has the following parameters: 5
    Resistive film thickness: t = 01 μm
    Resistive film length : l = 10 mm
    Resistive film width : w = 10 mm
    Sheet resistivity of gold film : $Ps = 2.44 \times 10^{-8}$ Ω/m. Calculate the planer resistance.

OR

12. a) Explain fabrication of MOSFET in detail. 7

    b) Explain thin film formation in MMIC. 6

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