

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES
(AUTONOMOUS)
M.Tech II-Semester Regular Examinations, May 2016
RF and Microwave Engineering
(Communication Systems)

Date:

Time: 3 hours

Max Marks: 60

Answer ONE Question from each unit

All questions carry equal marks

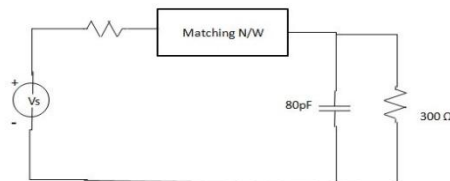
All parts of the question must be answered at one place only

Unit-I

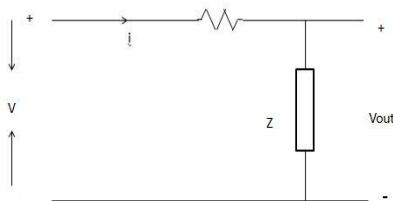
- 1) a) What are the main concepts we need to master design an RF or a microwave circuit? **(6M)**
b) Explain the merits and demerits of RF and microwave in detail. **(6M)**
or
2) a) How does a two conductor transmission line behave at low and high frequencies **(6M)**
b) Explain in detail the design considerations of low RF circuits **(3M)**
c) List out properties of RF and Microwaves. **(3M)**

Unit-II

- 3) a) Using the resonance method, design an impedance matching network that will block the flow of DC from the load, as shown in figure below, assume $f=1000\text{MHz}$ **(6M)**

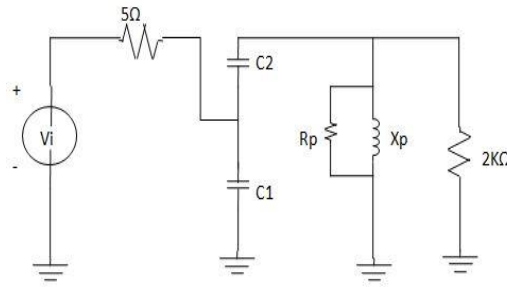


- b) Calculate the plot the voltage gain magnitude and phase if **(6M)**
i) the shunt element is the below figure is a perfect capacitor
ii) the shunt element in the below figure is a perfect inductor



Or

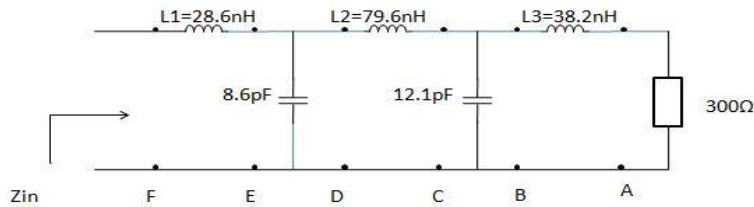
- 4) a) Design resonant circuit that operates between $R_s=50\Omega$ and $R_L=2000\Omega$, with a $Q=10$ at the center frequency $f_0=50\text{MHz}$. The inductor has a $Q_c=100$ at 100MHz . You may use a tapped C-transformer to achieve the desired Q for the circuit shown below in Figure. **(6M)**



- b) Explain in detail analysis of a circuit in phasor Domain (4M)
- c) Write about three element matching in brief. (2M)

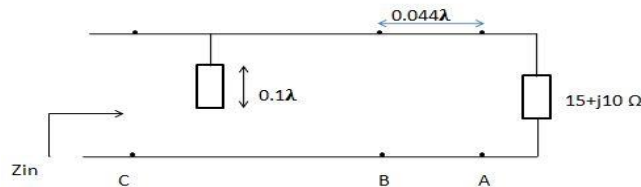
Unit-III

- 5) a) Explain the method of determination of input impedance (Z_{in}) using a know load (Z_L) and reflection coefficient. (6M)
- b) Find out impedance at 100MHz for the circuit shown in figure below (6M)



Or

- 6) a) Discuss in detail any two application of Smith Chart with clear explanation (6M)
- b) Consider a transmission line (Z_0)= $15+j10\Omega$, as show below in figure below. Calculate the input impedance of the line where the shunt open stub is located a distance of $d=0.044\lambda$ from the load and has a length of $l=0.14\lambda$. (6M)



Unit IV

- 7) a) Explain the steps in minimum – Noise multistage amplifier design. (6M)
- b) Design a microwave transistor amplifier for maximum gain using BJT whose s-parameters in a 50Ω systems are (6M)

$$S = \begin{bmatrix} 0.7 \angle -160 & 0 \\ 5 \angle 85 & 0.5 \angle -20 \end{bmatrix}$$

Or

- 8) a) Explain about Maximum gain amplifier design **(6M)**
b) Discuss the different types of microwave power combines **(6M)**

Unit-V

- 9) a) Explain the design procedure for transistor oscillator **(6M)**
b) Write about frequency tunable oscillator **(6M)**

Or

- 10) a) Describe a typical microwave oscillator circuits for use in communication applications. **(6M)**
b) Describe operation of Gunn diode oscillator **(6M)**
