R09

Code No: C6107, C6507

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH I SEMESTER EXAMINATIONS APRIL/MAY-2012
RF CIRCUIT DESIGN
(COMMON TO COMMUNICATION SYSTEMS, WIRELESS & MOBILE COMMUNICATIONS)

Time: 3hours **Max.Marks:60**

Answer any five questions
All questions carry equal marks
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1.a) Obtain the RF impedance response of a parallel LC circuit using corresponding equivalent circuits of L

b) The characteristics impedance of a co-axial cable is 50Ω and is assumed to be Lossless. If the load is a short circuit find the input impedance for the cable lengths of 2λ ,0.75λ and 0.5λ .

2.a) Define the terms , standing Wave Ratio, characteristic impedance and effective dielectric constant of a micro strip line.

b) Show that the input impedance of a loss less transmission line repeats itself every half wavelength such that $Z_{in}(l) = Z_{in}(l+m.\lambda/2)$.

3.a) Define scattering parameters of a 2 – port network and with the help of scattering parameters explain how forward and Reverse power gains can be computed.

b) A 100Ω micro strip transmission line is connected to a 75 Ω line. Determine reflection coefficient, SWR, % reflected power, return loss and insertion loss.

4.a) With suitable diagrams explain the working of a directional coupler.

b) With the equivalent circuit diagram and constructional details explain the functioning of a MESFET and its frequency response.

5.a) Describe how T and Π networks can be used for matching of high frequency transmission lines.

b) Explain how Kurod's identities and Richards transformation can be applied. (to design micro strip filters)

6.a) Discuss about classes of operation of RF amplifiers and explain how biasing should be done to implement each class of operation.

b) What are the draw backs of passive or self biased networks? How are they overcome in active biasing of a common emitter BJT RF amplifier?

7.a) Differentiate between negative resistance type and feed back type high frequency oscillators.

b) With necessary schematics explain how a varactor diode can be used to implement a voltage controlled oscillator. Obtain the expression for its frequency of oscillation.

8. Give brief description of the working of following:
a) Direct Digital Synthesiser
b) Harmonic mixers.

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