

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 75Ω 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.