Register Number: ……..

M.E DEGREE EXAMINATIONS: MAY/JUNE 2013

Third Semester

COMMUNICATION SYSTEMS

COM508: RF System Design

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

1. Draw the electromagnetic spectrum.
2. Write down the scattering matrix of an ideal lossless transmission line of length 'l' units.
3. State two important differences between a binomial filter and a Chebychev filter.
4. What is the concept behind filter implementation of kuroda's identities?
5. What is active biasing in amplifier design?
6. Compare HEMT device with the MESFET.
7. Write the various power relations in an amplifier.
8. Represent the 1 dB compression point of RF high power amplifier pictorially.
9. What are the various high frequency oscillator configurations?
10. Define conversion loss of a mixer.

PART B (5 x 16 = 80 Marks)

11. a) i) With necessary diagrams, explain in detail about how chip components are fabricated. (8)

    ii) W.r.t "RF behavior of passive components "explain the significance of Skin depth, Current density, Surface mounted devices and Lead Inductance. (8)

(OR)

    b) i) Obtain the equation of R circles of a Smith chart. (4)

    ii) State and prove unitary and phase shift properties of scattering parameters. (8)

    iii) Write down the expression of S_{11} in terms of ABCD parameters. (4)

12. a) Explain the design procedure of coupled micro strip line filter with necessary equations, diagrams and equivalent circuits.

(OR)

    b) Explain the realization of chebychev filter with relevant design equations. Also give the table of chebychev filter coefficients.

13. a) For a load impedance Z_L= (60-j95) Ω, design two single stub matching networks that transform the load to a Z_{in}= (75 + j90) Ω input impedance. Assume that both stub and transmission line have a characteristics impedance Z_0= 75 Ω.

(OR)

b) i) Explain how series and shunt elements of input and output matching networks are designed from the normal Smith Chart and also from an inverted Smith chart. (8)

ii) W.r.t. matching networks, explain loaded Q factor and nodal Q factor and their significance. Obtain the circle equation of the nodal Q factors to be drawn on smith chart. (8)

14. a) Explain RF amplifier design for maximum constant gain with operating and available power gain circles.

(OR)

b) Explain constant VSWR circles and derive equation for VSWR circle, centre and radius.

15. a) i) With suitable theory explain dielectric resonator oscillator. (8)

ii) Discuss the concept of PLL with neat block diagram. Also mention its applications. (8)

(OR)

b) Explain in detail the design of detector and demodulator circuits with necessary equations.

****