R09

Code No: C6107, C6507

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I Semester Examinations March/April-2011
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) Explain why skin effects are considered important for RF circuit design.
b) Describe briefly how passive components are realized on primted circuit boards at RF. [12]

2.a) Compare the characteristics of co-axial line, two -wire line and a parallel plate transmission line.
b) An input impedance of 25Ω of a $\lambda/4$ transformer is to be matched to a 50Ω micro strip transmission line at 500 MH_z compute the length, width and characteristic impedance of the quarter-wave parallel plate transmission line. The thickness and relative dielectric constant of the substrate material are given as1mm and 4.0 respectively. Make assumptions if necessary. [12]

3.a) Define the following terms for a transmission line.
i) Standing wave ratio ii) Return loss
iii) Power in dBm iv) characteristic impedance
b) Derive the expression for characteristic impedance of a short circuited transmission line. [12]

4.a) Describe how a tunable RF active filter can be realized.
b) With the help of neat diagrams describe the structure and functioning of a HEMT. [12]

5. Write a short note on low noise, linear RF BJT operation based on its structure. [12]

6.a) Enumerate the importance of 'power relations' in the design of an amplifier at high frequencies.
b) Explain how stable performance can be assured for an RF transistor amplifier using corresponding stability circles. [12]

7. Draw neat circuit diagrams to explain how gain-bandwidth product limitation can be overcome in an RF broadband amplifier design. [12]

8. With the help of neat schematics explain how oscillators should be configured to obtain high frequencies of oscillation. State the principle of operation. State the principle of operation of a dielectric resonator oscillator. [12]

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