

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MTech
BRANCH: ECE

SEMESTER: II
SESSION: SP/19

SUBJECT: EC551 RF CIRCUIT DESIGN

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Explain the block diagram of generic RF System and importance of Radio Frequency Design. [5]
Q.1(b) What are the following IEEE Frequency Spectrum bands: L band, C Band, K_U Band, K_a Band Millimeter Wave? [5]
- Q.2(a) Find the transfer function response of magnitude and phase for Lowpass filter. [5]
Q.2(b) Examine the even and odd mode excitations of a coupled microstrip lines. [5]
- Q.3(a) Develop the nodal quality factor (Q_n) circles. [5]
Q.3(b) For a broadband amplifier it is required to develop a Pi-type matching network that transforms a load impedance of $Z_L^* = (10 - j10) \Omega$ into an input impedance of $Z_{in} = (20 + j40) \Omega$. The design should involve the lowest possible nodal quality factor. Find the component values, assuming that matching should be achieved at a frequency $f = 2.4 \text{ GHz}$. [5]
- Q.4(a) Formulate the conditions for unconditional stability of an RF Amplifier. [5]
Q.4(b) Find the expression of constant Noise Figure circles and write down its properties. [5]
- Q.5(a) Discuss the principles of Negative Resistance Oscillator. [5]
Q.5(b) What is quartz oscillator? [5]

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