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BIELE-004

B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

June, 2015 00660

BIELE-004 : RF CIRCUITS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. Missing data may be suitably assumed. All questions carry equal marks. Use of scientific calculator is allowed.*

1. Give the electrical equivalent circuit representation of the following and explain the significance of the terms appearing in the equivalent circuit : *2×5=10*

(a) High-frequency capacitors

(b) High-frequency inductors

2. Prove that the circuit parameters for a parallel plate transmission line are given as

$$R = \frac{2}{w\sigma\delta}\ \Omega/m\ , \qquad L = \frac{\mu d}{w}\ H/m$$

$$G = \sigma_{diel}\frac{w}{d}\ S/m\ , \qquad C = \frac{\varepsilon w}{d}\ F/m$$

where the symbols have their usual meaning. *10*

3. Explain in brief the noise model for various passive components. *10*

4. Explain the concept of linearity and large signal operation of a low-noise amplifier. *10*

5. Explain the operation of diode-ring mixers with the help of a labelled diagram. Support your answer with necessary mathematical expressions. *10*

6. Explain the operation of the following RF power amplifiers with necessary mathematical expressions and waveforms : *2×5=10*

   (a) CLASS-A

   (b) CLASS-B

7. Explain the operation of a negative-resistance oscillator with required expression and waveform. *10*

8. What are the various phase noise considerations used in the design of synthesizers ? Explain them in brief. *10*

9. Explain the principle of modulation of power amplifiers. *10*

10. Write short notes on any ***two*** of the following : *2×5=10*

    (a) RF Interconnects

    (b) Zeros as Bandwidth Enhancers in High Frequency Amplifiers

    (c) Shunt-Series Amplifier

    (d) fT doublers
