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# Reg. No.

# SEVENTH SEMESTER B.Tech. (E & C) DEGREE END SEMESTER EXAMINATION NOV/DEC 2015

## SUBJECT: MICROWAVE INTEGRATED CIRCUITS (ECE - 441)

### **TIME: 3 HOURS**

#### Instructions to candidates

- Answer **ANY FIVE** full questions.
- Missing data may be suitably assumed.
- 1A. Design a microstrip high pass filter by Using distributed short circuited stubs for the given parameters n=4,  $f_c = 1.5GHz$ ,  $\varepsilon_r = 2.2$ , h = 1.57mm, the admittance are

$$y_1 = 0.32300, y_{1,2} = 1.07842, y_2 = 0.39443, y_{2,3} = 1.06488.$$

- 1B. Write three relative advantages and disadvantages of MMIC over hybrid MIC
- 1C. Explain the following:

i) Image frequency ii) Conversion Loss

2A.

From the fundamentals, derive the relation  $Z_0 = \sqrt{\frac{R+jwL}{G+jwC}}$ 

- 2B. What are the types of microstrip? Explain with neat diagram and also show field distribution in each microstrip.
- 2C. Write the application of MIC in satellite television system.
- 3A. Explain the fabrication method and working principle of PIN diode.
- 3B. What is Isolator? What are the applications of it? How does it changes the modes?
- 3C. What are the losses in microstrip? Explain with mathematical equations.
- 4A. Design a Wilkinson uncompensated 3 dB power Splitter at f = 1.33GHz, the substrate height h = 0.635mm and dielectric constant  $\varepsilon_r = 10.2$ .
- 4B. What are the types of MIC? What are the methods to form thick film on the substrate? Explain in detail.
- 4C. What are the different types of phase shifters? Explain them.
- 5A. Discuss the various types of losses in transmission line. Explain with mathematical equations.
- 5B. What is frequency multiplier? Explain diode frequency multiplier.
- 5C. What are types of coupler? Explain it.
- 6A. Determine the characteristics impedance and the effective dielectric constants for a microstrip transmission line fabricated in an alumina substrate ( $e_r = 9.7$ ) if the ratio w/h is (i) 0.5 (ii) 5. Also find the velocity of propagation in each case.
- 6B. How the frequencies are up and down converted in the microwave mixer? Explain mathematically.
- 6C. What is gyromagnetic resonance?



MAX. MARKS: 50

(5+3+2)

(5+3+2)

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