USN | | | | | | | | | | 14EVE254

Second Semester M.Tech. Degree Examination, June/July 2015
CMOS RF Circuit Design

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions.*

1   a. What is inter symbol interference? Explain its effect and methods for reducing. (06 Marks)
    b. With a neat block diagram explain generic digital transceiver RF system. (06 Marks)
    c. Explain intermodulation and hence obtain an expression for AIP_3 and relation between 1dB compression point and input IP_3. (08 Marks)

2   a. Show the phase transitions in QPSK and OQPSK waveforms. (04 Marks)
    b. With neat diagram explain working of DPSK. Give an example. (08 Marks)
    c. What is code division multiple access? Explain direct sequence CDMA technique. (08 Marks)

3   a. With a neat block diagram explain, Direct conversion and two step transmitter. (10 Marks)
    b. Write a block diagram of Hartley image reject receiver architecture and derive an expression for image rejection ratio. (10 Marks)

4   a. Obtain a high frequency small signal equivalent circuit of BJT and explain it (10 Marks)
    b. Explain the behavior of MOS transistor at very high frequency. (10 Marks)

5   a. Derive an expression for the voltage conversion gain and power gain in biopolar mixers. (10 Marks)
    b. Write a note on CMOS LNAs. (10 Marks)

6   a. Define phase noise. Explain the effect of phase-noise in RF communication. (08 Marks)
    b. Explain Noise-power tradeoff in oscillators. (06 Marks)
    c. Draw the linear model of a phase locked loop (PLL) and derive an expression for closed loop transfer function H(s). (06 Marks)

7   a. What is RF synthesizer? Explain fractional – N synthesizer with an example. (10 Marks)
    b. Explain the feed forward and feedback linearization technique with its advantages and disadvantages. (10 Marks)

8   a. Write a short note on:
       (i) Sensitivity of an RF receiver and Dynamic Range.
       (ii) Sub sampling receiver. (12 Marks)
    b. Define the following :
       (i) 1 – dB compression point
       (ii) Cross modulation
       (iii) Desensitization
       (iv) Q of an oscillator. (08 Marks)

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