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Question Paper Code : 20538

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Fifth Semester

Electronics and Communication Engineering

CEC 350 – RF TRANSCEIVERS

(Common to : Electronics and Telecommunication Engineering)

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Interpret IP2 and IP3 in RF measurement.
2. List any four performance measurement tests for transceivers.
3. What are scattering parameters?
4. Highlight the significance of open-circuit time constant (OCT) method.
5. What is meant by thermal runaway?
6. Mention the various efficiency boosting techniques.
7. Sketch the response curve of the four major RF filters.
8. Write the significant characteristics of mixers.
9. How can SR flip-flop be used as a phase detector?
10. Outline the function of direct digital frequency synthesis method.

PART B — (5 × 13 = 65 marks)

11. (a) Identify the various sources of noise in MOSFETs.

Or

(b) Suggest any two approaches to circumvent the problem of LO pulling in transmitters and explain.

12. (a) Discuss about the three configurations of conductors with necessary diagrams.

Or

(b) Identify the shortcoming in single-ended LNA and design a 1.5 GHz differential LNA.

13. (a) Outline the various techniques for determining the stability of closed-loop systems.

Or

(b) Explain in detail how lag compensation can be achieved in inverting amplifier and mention its impact.

14. (a) Describe the functional model of Colpitts oscillator and derive the necessary equations to determine the amplitude of oscillation.

Or

(b) How potentiometric mixers are different from Gilbert-type mixers? Explain.

15. (a) Design an injection-locked frequency divider and plot its characteristics in locked and unlocked modes.

Or

(b) Identify the steps involved in the design of a loop filter and explain.

PART C — ($1 \times 15 = 15$ marks)

16. (a) Illustrate with suitable diagrams the architectural features of Philips GSM transceiver.

Or

(b) Suppose we want to design a linear amplifier for use in a 1-GHZ communications system. The requirements are to supply 1 W into 50 ohms. Assume that a 3.3-V DC power supply is available. Specify important device parameters, compute all component values, and estimate drain efficiency.

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